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For easy installation, Download the latest released Orange version from our website. To install an add-on, head to Options -> Add-ons... in the menu bar. First, install Miniconda for your OS. Then, create a new conda environment, and install orange3: # Add conda-forge to your channels for access to the latest release conda config --add channels conda-forge # Perhaps enforce strict conda-forge priority conda config --set channel_priority strict # Create and activate an environment for Orange conda create python=3.10 --yes --name orange3 conda activate orange3 # Install Orange conda install orange3 For installation of an add-on, use: conda install orange3- See specific add-on repositories for details. We recommend using our standalone installer or conda, but Orange is also installable with pip. You will need a C/C++ compiler (on Windows we suggest using Microsoft Visual Studio Build Tools). Orange needs PyQt to run. Install either: PyQt5 and PyQtWebEngine: pip install -r requirements-pyqt.txt PyQt6 and PyQt6-WebEngine: pip install PyQt6 PyQt6-WebEngine To install Orange with winget, run: winget install --id UniversityofLjubljana.Orange Ensure you've activated the correct virtual environment. If following the above conda instructions: Run orange-canvas or python3 -m Orange.canvas. Add --help for a list of program options. Starting up for the first time may take a while. Want to write a widget? Use the Orange3 example add-on template. Want to get involved? Join us on Discord, introduce yourself in #general! Take a look at our contributing guide and style guidelines. Check out our widget development docs for a comprehensive guide on writing Orange widgets. The development of core Orange is primarily split into three repositories: biolab/orange-canvas-core implements the canvas, biolab/orange-widget-base is a handy widget GUI library, biolab/orange3 brings it all together and implements the base data mining toolbox. Additionally, add-ons implement additional widgets for more specific use cases. Anyone can write an add-on. Some of our first-party add-ons: First, fork the repository by pressing the fork button in the top-right corner of this page. Set your GitHub username, export MY_GITHUB_USERNAME=replaceme create a conda environment, clone your fork, and install it: conda create python=3.10 --yes --name orange3 conda activate orange3 git clone ssh://git@github.com/$MY_GITHUB_USERNAME/orange3 # Install PyQT and PyQtWebEngine. You can also use PyQt6 pip install -r orange3/requirements-pyqt.txt pip install -e orange3 Now you're ready to work with git. See GitHub's guides on pull requests, forks if you're unfamiliar. If you're having trouble, get in touch on Discord. Run Orange with python -m Orange.canvas (after activating the conda environment). python -m Orange.canvas -l 2 --no-splash --no-welcome will skip the splash screen and welcome window, and output more debug info. Use -l 4 for more. Add --clear-widget-settings to clear the widget settings before start. To explore the dark side of the Orange, try --style=fusion:breeze-dark Argument --help lists all available options. To run tests, use unittest Orange.tests Orange.widgets.tests Should you wish to contribute Orange's base components (the widget base and the canvas), you must also clone these two repositories from Github instead of installing them as dependencies of Orange3. First, fork all the repositories to which you want to contribute. Set your GitHub username, export MY_GITHUB_USERNAME=replaceme create a conda environment, clone your forks, and install them: conda create python=3.10 --yes --name orange3 conda activate orange3 # Install PyQT and PyQtWebEngine. You can also use PyQt6 pip install -r requirements-pyqt.txt git clone ssh://git@github.com/$MY_GITHUB_USERNAME/orange-widget-base pip install -e orange-widget-base git clone ssh://git@github.com/$MY_GITHUB_USERNAME/orange-canvas-core pip install -e orange-canvas-core git clone ssh://git@github.com/$MY_GITHUB_USERNAME/orange3 pip install -e orange3 # Repeat for any add-on repositories It's crucial to install orange-base-widget and orange-canvas-core before orange3 to ensure that orange3 will use your local versions. Visual representation of data "Dataviz" redirects here. For the software company, see DataViz. This article may need to be cleaned up. It has been merged from Information visualization. Statistician professor Edward Tufte described Charles Joseph Minard's 1869 graphic of Napoleonic France's invasion of Russia as what "may well be the best statistical graphic ever drawn", noting that it captures six variables in two dimensions.[1] Part of a series on StatisticsData and information visualization Major dimensions Exploratory data analysis Information design Interactive data visualization Descriptive statistics Inferential statistics Statistical graphics Plot Data analysis Infographic Data science Important figures Tamara Munzner Ben Shneiderman John Tukey Edward Tufte Simon Wardley Hans Rosling David McCandless Kim Albrecht Alexander Osterwalder Ed Hawkins Hadley Wickham Leland Wilkinson Mike Bostock Jeffrey Heer Ihab Ilyas Information graphic types Line chart Bar chart Histogram Scatter plot Box plot Pareto chart Pie chart Area chart Tree map Bubble chart Stripe graphic Control chart Run chart Stem-and-leaf display Cartogram Small multiple Sparkline Table Marimekko chart Related topics Data Information Big data Database Chartjunk Visual perception Regression analysis Statistical model Misleading graph Topological data analysis vte Information mapping Topics and fields Business decision mapping Data visualization Graphic communication Infographics Information design Knowledge visualization Mental model Morphological analysis Ontology (information science) Schema (psychology) Visual analytics Visual language Node–link approaches Argument map Cladistics Cognitive map Concept lattice Concept map Conceptual graph Decision tree Dendrogram Graph drawing Hyperbolic tree Hypertext Issue map Issue tree Layered graph drawing Mind map Object-role modeling Organizational chart Pathfinder network Radial tree Semantic network Sociogram Timeline Topic map Tree structure ZigZag See also Design rationale Diagrammatic reasoning Entity–relationship model Geovisualization List of concept- and mind-mapping software Olog Ontology (philosophy) Problem structuring methods Semantic Web Treemapping Wicked problem vte Data and information visualization (data viz/vis or info viz/vis)[2] is the practice of designing and creating graphic or visual representations of a large amount[3] of complex quantitative and qualitative data and information with the help of static, dynamic or interactive visual items. Typically based on data and information collected from a certain domain of expertise, these visualizations are intended for a broader audience to help them visually explore and discover, quickly understand, interpret and gain important insights into otherwise difficult-to-identify structures, relationships, correlations, local and global patterns, trends, variations, constancy, clusters, outliers and unusual groupings within data (exploratory visualization).[4][5][6] When intended for the general public (mass communication) to convey a concise version of known, specific information in a clear and engaging manner (presentational or explanatory visualization),[4] it is typically called information graphics. Data visualization is concerned with presenting sets of primarily quantitative raw data in a schematic form, using imagery. The visual formats used in data visualization include charts and graphs (e.g. pie charts, bar charts, line charts, area charts, cone charts, pyramid charts, donut charts, histograms, spectrograms, cohort charts, waterfall charts, funnel charts, bullet graphs, etc.), diagrams, plots (e.g. scatter plots, distribution plots, box-and-whisker plots), geospatial maps (such as proportional symbol maps, choropleth maps, isopleth maps and heat maps), figures, correlation matrices, percentage gauges, etc., which sometimes can be combined in a dashboard. Information visualization, on the other hand, deals with multiple, large-scale and complicated datasets which contain quantitative (numerical) data as well as qualitative (non-numerical, i.e. verbal or graphical) and primarily abstract information and its goal is to add value to raw data, improve the viewers' comprehension, reinforce their cognition and help them derive insights and make decisions as they navigate and interact with the computer-supported graphical display. Visual tools used in information visualization include maps for location based data; hierarchical[7] organisations of data such as tree maps, radial_trees, and other tree_structures; displays that prioritise relationships (Heer et al. 2010) such as Sankey diagrams, network diagrams, venn diagrams, mind maps, semantic networks, entity-relationship diagrams; flow charts, timelines, etc. Emerging technologies like virtual, augmented and mixed reality have the potential to make information visualization more immersive, intuitive, interactive and easily manipulable and thus enhance the user's visual perception and cognition.[8] In data and information visualization, the goal is to graphically present and explore abstract, non-physical and non-spatial data collected from databases, information systems, file systems, documents, business data, etc. (presentational and exploratory visualization) which is different from the field of scientific visualization, where the goal is to render realistic images based on physical and spatial scientific data to confirm or reject hypotheses (confirmatory visualization).[9] Effective data visualization is properly sourced, contextualized, simple and uncluttered. The underlying data is accurate and up-to-date to make sure that insights are reliable. Graphical items are well-chosen for the given datasets and aesthetically appealing, with shapes, colors and other visual elements used deliberately in a meaningful and non-distracting manner. The visuals are accompanied by supporting texts (labels and titles). These verbal and graphical components complement each other to ensure clear, quick and memorable understanding. Effective information visualization is aware of the needs and concerns and the level of expertise of the target audience, deliberately guiding them to the intended conclusion.[10][3] Such effective visualization can be used not only for conveying specialized, complex, big data-driven ideas to a wider group of non-technical audience in a visually appealing, engaging and accessible manner, but also to domain experts and executives for making decisions, monitoring performance, generating new ideas and stimulating research.[10][4] In addition, data scientists, data analysts and data mining specialists use data visualization to check the quality of data, find errors, unusual gaps and missing values in data, clean data, explore the structures and features of data and assess outputs of data-driven models.[4] In business, data and information visualization can constitute a part of data storytelling, where they are paired with a coherent narrative structure or storyline to contextualize the analyzed data and communicate the insights gained from analyzing the data clearly and memorably with the goal of convincing the audience into making a decision or taking an action in order to create business value.[3][11] This can be contrasted with the field of statistical graphics, where complex statistical data are communicated graphically in an accurate and precise manner among researchers and analysts with statistical expertise to help them perform exploratory data analysis or to convey the results of such analyses, where visual appeal, capturing attention to a certain issue and storytelling are not as important.[12] The field of data and information visualization is of interdisciplinary nature as it incorporates principles found in the disciplines of descriptive statistics (as early as the 18th century),[13] visual communication, graphic design, cognitive science and, more recently, interactive computer graphics and human-computer interaction.[14] Since effective visualization requires design skills, statistical skills and computing skills, it is argued by authors such as Gershon and Page that it is both an art and a science.[15] The neighboring field of visual analytics marries statistical data analysis, data and information visualization and human analytical reasoning through interactive visual interfaces to help human users reach conclusions, gain actionable insights and make informed decisions which are otherwise difficult for computers to do. Research into how people read and misread various types of visualizations is helping to determine what types and features of visualizations are most understandable and effective in conveying information.[16][17] On the other hand, unintentionally poor or intentionally misleading and deceptive visualizations (misinformative visualization) can function as powerful tools which disseminate misinformation, manipulate public perception and divert public opinion toward a certain agenda.[18] Thus data visualization literacy has become an important component of data and information literacy in the information age akin to the roles played by textual, mathematical and visual literacy in the past.[19] Data visualization is one of the steps in analyzing data and presenting it to users. Partial map of the Internet early 2005 represented as a graph; each line represents two IP addresses, and some delay between those two nodes. The field of data and information visualization has emerged "from research in human–computer interaction, computer science, graphics, visual design, psychology, photography and business methods. It is increasingly applied as a critical component in scientific research, digital libraries, data mining, financial data analysis, market studies, manufacturing production control, and drug discovery".[20] Data and information visualization presumes that "visual representations and interaction techniques take advantage of the human eye's broad bandwidth pathway into the mind to allow users to see, explore, and understand large amounts of information at once. Information visualization focused on the creation of approaches for conveying abstract information in intuitive ways."[21] Data analysis is an indispensable part of all applied research and problem solving in industry. The most fundamental data analysis approaches are visualization (histograms, scatter plots, surface plots, tree maps, parallel coordinate plots, etc.), statistics (hypothesis test, regression, PCA, etc.), data mining (association mining, etc.), and machine learning methods (clustering, classification, decision trees, etc.). Among these approaches, information visualization, or visual data analysis, is the most reliant on the cognitive skills of human analysts, and allows the discovery of unstructured actionable insights that are limited only by human imagination and creativity. The analyst does not have to learn any sophisticated methods to be able to interpret the visualizations of the data. Information visualization is also a hypothesis generation scheme, which can be, and is typically followed by more analytical or formal analysis, such as statistical hypothesis testing. To communicate information clearly and efficiently, data visualization uses statistical graphics, plots, information graphics and other tools. Numerical data may be encoded using dots, lines, or bars, to visually communicate a quantitative message.[22] Effective visualization helps users analyze and reason about data and evidence.[23] It makes complex data more accessible, understandable, and usable, but can also be reductive.[24] Users may have particular analytical tasks, such as making comparisons or understanding causality, and the design principle of the graphic (i.e., showing comparisons or showing causality) follows the task. Tables are generally used where users will look up a specific measurement, while charts of various types are used to show patterns or relationships in the data for one or more variables. Data visualization refers to the techniques used to communicate data or information by encoding it as visual objects (e.g., points, lines, or bars) contained in graphics. The goal is to communicate information clearly and efficiently to users. It is one of the steps in data analysis or data science. According to Vitaly Friedman (2008) the "main goal of data visualization is to communicate information clearly and effectively through graphical means. It doesn't mean that data visualization needs to look boring to be functional or extremely sophisticated to look beautiful. To convey ideas effectively, both aesthetic form and functionality need to go hand in hand, providing insights into a rather sparse and complex data set by communicating its key aspects in a more intuitive way. Yet designers often fail to achieve a balance between form and function, creating gorgeous data visualizations which fail to serve their main purpose — to communicate information".[25] Indeed, Fernanda Viegas and Martin M. Wattenberg suggested that an ideal visualization should not only communicate clearly, but stimulate viewer engagement and attention.[26] Data visualization is closely related to information graphics, information visualization, scientific visualization, exploratory data analysis and statistical graphics. In the new millennium, data visualization has become an active area of research, teaching and development. According to Post et al. (2002), it has united scientific and information visualization.[27] In the commercial environment data visualization is often referred to as dashboards. Infographics are another very common form of data visualization. The greatest value of a picture is when it forces us to notice what we never expected to see. John Tukey[28] Edward Tufte has explained that users of information displays are executing particular analytical tasks such as making comparisons. The design principle of the information graphic should support the analytical task.[29] As William Cleveland and Robert McGill show, different graphical elements accomplish this more or less effectively. For example, dot plots and bar charts outperform pie charts.[30] In his 1983 book The Visual Display of Quantitative Information,[31] Edward Tufte defines 'graphical displays' and principles for effective graphical display in the following passage: "Excellence in statistical graphics consists of complex ideas communicated with clarity, precision, and efficiency. Graphical displays should: show the data induce the viewer to think about the substance rather than about methodology, graphic design, the technology of graphic production, or something else avoid distorting what the data has to say present many numbers in a small space make large data sets coherent encourage the eye to compare different pieces of data reveal the data at several levels of detail, from a broad overview to the fine structure serve a reasonably clear purpose: description, exploration, tabulation, or decoration be closely integrated with the statistical and verbal descriptions of a data set. Graphics reveal data. Indeed, graphics can be more precise and revealing than conventional statistical computations."[32] For example, the Minard diagram shows the losses suffered by Napoleon's army in the 1812–1813 period. Six variables are plotted: the size of the army, its location on a two-dimensional surface (x and y), time, the direction of movement, and temperature. The line width illustrates a comparison (size of the army at points in time), while the temperature axis suggests a cause of the change in army size. This multivariate display on a two-dimensional surface tells a story that can be grasped immediately while identifying the source data to build credibility. Tufte wrote in 1983 that: "It may well be the best statistical graphic ever drawn."[32] Not applying these principles may result in misleading graphs, distorting the message, or supporting an erroneous conclusion. According to Tufte, chartjunk refers to the extraneous interior decoration of the graphic that does not enhance the message or gratuitous three-dimensional or perspective effects. Needlessly separating the explanatory key from the image itself, requiring the eye to travel back and forth from the image to the key, is a form of "administrative debris." The ratio of "data to ink" should be maximized, erasing non-data ink where feasible.[32] The Congressional Budget Office summarized several best practices for graphical displays in a June 2014 presentation. These included: a) Knowing your audience; b) Designing graphics that can stand alone outside the report's context; and c) Designing graphics that communicate the key messages in the report.[33] Useful criteria for a data or information visualization include:[34] It is based on (non-visual) data - that is, a data/info viz is not image processing and collage; It creates an image - specifically that the image plays the primary role in communicating meaning and is not an illustration accompanying the data in text form; and The result is readable. Readability means that it is possible for a viewer to understand the underlying data, such as by making comparisons between proportionally sized visual elements to compare their respective data values; or using a legend to decode a map, like identifying coloured regions on a climate map to read temperature at that location. For greatest efficiency and simplicity of design and user experience, this readability is enhanced through the use of bijective mapping in that design of the image elements - where the mapping of representational element to data variable is unique.[35] Kosara (2007)[34] also identifies the need for a visualisation to be "recognisable as a visualisation and not appear to be something else". He also states that recognisability and readability may not always be required in all types of visualisation e.g. "informative art" (which would still meet all three above criteria but might not look like a visualisation) or "artistic visualisation" (which similarly is still based on non-visual data to create an image, but may not be readable or recognisable). The same dataset plotted in three charts: Top panel is a bar chart depicting the flow of occurrences over time (resembles the Sankey diagram in the New York Times original[36]). Middle panel is a bubble chart that separately quantifies discrete outcomes. Bottom panel is an exploded pie chart showing relative shares of categories, and shares within categories. Author Stephen Few described eight types of quantitative messages that users may attempt to understand or communicate from a set of data and the associated graphs used to help communicate the message: Time-series: A single variable is captured over a period of time, such as the unemployment rate or temperature measures over a 10-year period. A line chart may be used to demonstrate the trend over time. Ranking: Categorical subdivisions are ranked in ascending or descending order, such as a ranking of sales performance (the measure) by sales persons (the category, with each sales person a categorical subdivision) during a single period. A bar chart may be used to show the comparison across the sales persons. Part-to-whole: Categorical subdivisions are measured as a ratio to the whole (i.e., a percentage out of 100%). A pie chart or bar chart can show the comparison of ratios, such as the market share represented by competitors in a market. Deviation: Categorical subdivisions are compared against a reference, such as a comparison of actual vs. budget expenses for several departments of a business for a given time period. A bar chart can show comparison of the actual versus the reference amount. Frequency distribution: Shows the number of observations of a particular variable for given interval, such as the number of years in which the stock market return is between intervals such as 0–10%, 11–20%, etc. A histogram, a type of bar chart, may be used for this analysis. A boxplot helps visualize key statistics about the distribution, such as median, quartiles, outliers, etc. Correlation: Comparison between observations represented by two variables (X,Y) to determine if they tend to move in the same or opposite directions. For example, plotting unemployment (X) and inflation (Y) for a sample of months. A scatter plot is typically used for this message. Nominal comparison: Comparing categorical subdivisions in no particular order, such as the sales volume by product code. A bar chart may be used for this comparison. Geographic or geospatial: Comparison of a variable across a map or layout, such as the unemployment rate by state or the number of persons on the various floors of a building. A cartogram is a typical graphic used.[22][37] Analysts reviewing a set of data may consider whether some or all of the messages and graphic types above are applicable to their task and audience. The process of trial and error to identify meaningful relationships and messages in the data is part of exploratory data analysis. A human can distinguish differences in line length, shape, orientation, distances, and color (hue) readily without significant processing effort; these are referred to as "pre-attentive attributes". For example, it may require significant time and effort ("attentive processing") to identify the number of times the digit "5" appears in a series of numbers; but if that digit is different in size, orientation, or color, instances of the digit can be noted quickly through pre-attentive processing.[38] Compelling graphics take advantage of pre-attentive processing and attributes and the relative strength of these attributes. For example, since humans can more easily process differences in line length than surface area, it may be more effective to use a bar chart (which takes advantage of line length to show comparison) rather than pie charts (which use surface area to show comparison).[38] Almost all data visualizations are created for human consumption. Knowledge of human perception and cognition is necessary when designing intuitive visualizations.[39] Cognition refers to processes in human beings like perception, attention, learning, memory, thought, concept formation, reading, and problem solving.[40] Human visual processing is efficient in detecting changes and making comparisons between quantities, sizes, shapes and variations in lightness. When properties of symbolic data are mapped to visual properties, humans can browse through large amounts of data efficiently. It is estimated that 2/3 of the brain's neurons can be involved in visual processing. Proper visualization provides a different approach to show potential connections, relationships, etc. which are not as obvious in non-visualized quantitative data. Visualization can become a means of data exploration. Studies have shown individuals used on average 19% less cognitive resources, and 4.5% better able to recall details when comparing data visualization with text.[41] See also: Infographics § History Selected milestones and inventions The modern study of visualization started with computer graphics, which "has from its beginning been used to study scientific problems. However, in its early days the lack of graphics power often limited its usefulness. The recent emphasis on visualization started in 1987 with the special issue of Computer Graphics on Visualization in Scientific Computing. Since then there have been several conferences and workshops, co-sponsored by the IEEE Computer Society and ACM SIGGRAPH".[42] They have been devoted to the general topics of data visualization, information visualization and scientific visualization, and more specific areas such as volume visualization. In 1786, William Playfair published the first presentation graphics. Product Space Localization, intended to show the Economic Complexity of a given economy Tree map of Benin exports (2009) by product category. The product exports treemaps are one of the most recent applications of these kind of visualizations, developed by the Harvard-MIT Observatory of Economic Complexity. There is no comprehensive 'history' of data visualization. There are no accounts that span the entire development of visual thinking and the visual representation of data, and which collate the contributions of disparate disciplines.[43] Michael Friendly and Daniel J Denis of York University are engaged in a project that attempts to provide a comprehensive history of visualization. Contrary to general belief, data visualization is not a modern development. Since prehistory, stellar data, or information such as location of stars were visualized on the walls of caves (such as those found in Lascaux Cave in Southern France) since the Pleistocene era.[44] Physical artefacts such as Mesopotamian clay tokens (5500 BC), Inca quipus (2600 BC) and Marshall Islands stick charts (n.d.) can also be considered as visualizing quantitative information.[45][46] The first documented data visualization can be tracked back to 1160 B.C. with Turin Papyrus Map which accurately illustrates the distribution of geological resources and provides information about quarrying of those resources.[47] Such maps can be categorized as thematic cartography, which is a type of data visualization that presents and communicates specific data and information through a geographical illustration designed to show a particular theme connected with a specific geographic area. Earliest documented forms of data visualization were various thematic maps from different cultures and ideograms and hieroglyphs that provided and allowed interpretation of information illustrated. For example, Linear B tablets of Mycenae provided a visualization of information regarding Late Bronze Age era trades in the Mediterranean. The idea of coordinates was used by ancient Egyptian surveyors in laying out towns, earthly and heavenly positions were located by something akin to latitude and longitude at least by 200 BC, and the map projection of a spherical Earth into latitude and longitude by Claudius Ptolemy [c. 85–c. 165] in Alexandria would serve as reference standards until the 14th century.[47] The invention of paper and parchment allowed further development of visualizations throughout history. Figure shows a graph from the 10th or possibly 11th century that is intended to be an illustration of the planetary movement, used in an appendix of a textbook in monastery schools.[48] The graph apparently was meant to represent a plot of the inclinations of the planetary orbits as a function of the time. For this purpose, the zone of the zodiac was represented on a plane with a horizontal line divided into thirty parts as the time or longitudinal axis. The vertical axis designates the width of the zodiac. The horizontal scale appears to have been chosen for each planet individually for the periods cannot be reconciled. The accompanying text refers only to the amplitudes. The curves are apparently not related in time. Planetary movements By the 16th century, techniques and instruments for precise observation and measurement of physical quantities, and geographic and celestial position were well-developed (for example, a "wall quadrant" constructed by Tycho Brahe [1546–1601], covering an entire wall in his observatory). Particularly important were the development of triangulation and other methods to determine mapping locations accurately.[43] Very early, the measure of time led scholars to develop innovative way of visualizing the data (e.g. Lorenz Codomann in 1596, Johannes Temporarius in 1596[49]). French philosopher and mathematician René Descartes and Pierre de Fermat developed analytic geometry and two-dimensional coordinate system which heavily influenced the practical methods of displaying and calculating values. Fermat and Blaise Pascal's work on statistics and probability theory laid the groundwork for what we now conceptualize as data.[43] According to the Interaction Design Foundation, these developments allowed and helped William Playfair, who saw potential for graphical communication of quantitative data, to generate and develop graphical methods of statistics.[39] Playfair TimeSeries In the second half of the 20th century, Jacques Bertin used quantitative graphs to represent information "intuitively, clearly, accurately, and efficiently".[39] John Tukey and Edward Tufte pushed the bounds of data visualization; Tukey with his new statistical approach of exploratory data analysis and Tufte with his book "The Visual Display of Quantitative Information" paved the way for refining data visualization techniques for more than statisticians. With the progression of technology came the progression of data visualization; starting with hand-drawn visualizations and evolving into more technical applications – including interactive designs leading to software visualization.[50] Programs like SAS, SOFA, R, Minitab, Cornerstone and more allow for data visualization in the field of statistics. Other data visualization applications, more focused and unique to individuals, programming languages such as D3, Python (through matplotlib, seaborn) and JavaScript and Java(through JavaFX) help to make the visualization of quantitative data a possibility. Private schools have also developed programs to meet the demand for learning data visualization and associated programming libraries, including free programs like The Data Incubator or paid programs like General Assembly.[51] Beginning with the symposium "Data to Discovery" in 2013, ArtCenter College of Design, Caltech and JPL in Pasadena have run an annual program on interactive data visualization.[52] The program asks: How can interactive data visualization help scientists and engineers explore their data more effectively? How can computing, design, and design thinking help maximize research results? What methodologies are most effective for leveraging knowledge from these fields? By encoding relational information with appropriate visual and interactive characteristics to help interrogate, and ultimately gain new insight into data, the program develops new interdisciplinary approaches to complex science problems, combining design thinking and the latest methods from computing, user-centered design, interaction design and 3D graphics. Data visualization involves specific terminology, some of which is derived from statistics. For example, author Stephen Few defines two types of data, which are used in combination to support a meaningful analysis or visualization: Categorical: Represent groups of objects with a particular characteristic. Categorical variables can either be nominal or ordinal. Nominal variables for example gender have no order between them and are thus nominal. Ordinal variables are categories with an order, for sample recording the age group someone falls into.[53] Quantitative: Represent measurements, such as the height of a person or the temperature of an environment. Quantitative variables can either be continuous or discrete. Continuous variables capture the idea that measurements can always be made more precisely. While discrete variables have only a finite number of possibilities, such as a count of some outcomes or an age measured in whole years.[53] The distinction between quantitative and categorical variables is important because the two types require different methods of visualization. Two primary types of information displays are tables and graphs. A table contains quantitative data organized into rows and columns with categorical labels. It is primarily used to look up specific values. In the example above, the table might have categorical column labels representing the name (a qualitative variable) and age (a quantitative variable), with each row of data representing one person (the sampled experimental unit or category subdivision). A graph is primarily used to show relationships among data and portrays values encoded as visual objects (e.g., lines, bars, or points). Numerical values are displayed within an area delineated by one or more axes. These axes provide scales (quantitative and categorical) used to label and assign values to the visual objects. Many graphs are also referred to as charts. [54] Eppler and Lengler have developed the "Periodic Table of Visualization Methods," an interactive chart displaying various data visualization methods. It includes six types of data visualization methods: data, information, concept, strategy, metaphor and compound.[55] In "Visualization Analysis and Design" Tamara Munzner writes "Computer-based visualization systems provide visual representations of datasets designed to help people carry out tasks more effectively." Munzner argues that visualization "is suitable when there is a need to augment human capabilities rather than replace people with computational decision-making methods."[56] See also: Diagram and Infographic § Data visualization Name Visual dimensions Description / Example usages Bar chart of tips by day of week Bar chart length/count category color Presents categorical data with rectangular bars with heights or lengths proportional to the values that they represent. The bars can be plotted vertically or horizontally. A bar graph shows comparisons among discrete categories. One axis of the chart shows the specific categories being compared, and the other axis represents a measured value. Some bar graphs present bars clustered in groups of more than one, showing the values of more than one measured variable. These clustered groups can be differentiated using color. For example; comparison of values, such as sales performance for several persons or businesses in a single time period. Variable-width bar chart relating: · population (along x axis), · per-person emissions 1990-2018 (along y axis), and · total emissions (area as x*y product of values) Variable-width ("variwide") bar chart category (size/count/extent in first dimension) size/count/extent in second dimension size/count/extent as area of bar color Includes most features of basic bar chart, above Areas of non-uniform-width bars represent quantities with areas A that are respective products of related pairs of · vertical-axis quantities (A/X) and · horizontal-axis quantities (X). Arithmetically: (A/X)*X=A for each bar Instances: Mosaic plots (also known as Marimekko, or Mekko, charts) Projected (1) frequency and (2) intensity of extreme "10-year heat waves" are connected in pairs of horizontal and vertical bars, respectively. Bars are distinguished by (3) color-coded primary category (degree of global warming). Orthogonal (orthogonal composite) bar chart numerical value of first variable (extent in first dimension; superimposed horizontal bars) numerical value of second variable (extent in second dimension; like conventional vertical bar chart) category for first and second variables (e.g., color-coded) Includes most features of basic bar chart, above Pairs of numeric variables, usually color-coded, rendered by category Variables need not be directly related in the way they are in "variwide" charts Histogram of housing prices Histogram bin limits count/length color An approximate representation of the distribution of numerical data. Divide the entire range of values into a series of intervals and then count how many values fall into each interval this is called binning. The bins are usually specified as consecutive, non-overlapping intervals of a variable. The bins (intervals) must be adjacent, and are often (but not required to be) of equal size. For example, determining frequency of annual stock market percentage returns within particular ranges (bins) such as 0–10%, 11–20%, etc. The height of the bar represents the number of observations (years) with a return % in the range represented by the respective bin. A scatterplot showing negative correlation between two variables Scatter plot (dot plot) x position y position symbol/glyph color size Uses Cartesian coordinates to display values for typically two variables for a set of data. Points can be coded via color, shape and/or size to display additional variables. Each point on the plot has an associated x and y term that determines its location on the cartesian plane. Scatter plots are often used to highlight the correlation between variables (x and y). Also called "dot plots" Scatter plot Scatter plot (3D) position x position y position z color symbol size Similar to the 2-dimensional scatter plot above, the 3-dimensional scatter plot visualizes the relationship between typically 3 variables from a set of data. Again point can be coded via color, shape and/or size to display additional variables Network analysis Network nodes size nodes color ties thickness ties color spatialization Finding clusters in the network (e.g. grouping Facebook friends into different clusters). Discovering bridges (information brokers or boundary spanners) between clusters in the network Determining the most influential nodes in the network (e.g. A company wants to target a small group of people on Twitter for a marketing campaign). Finding outlier actors who do not fit into any cluster or are in the periphery of a network. Pie chart Pie chart color Represents one categorical variable which is divided into slices to illustrate numerical proportion. In a pie chart, the arc length of each slice (and consequently its central angle and area), is proportional to the quantity it represents. For example, as shown in the graph to the right, the proportion of English native speakers worldwide Line chart Line chart x position y position symbol/glyph color size Represents information as a series of data points called 'markers' connected by straight line segments. Similar to a scatter plot except that the measurement points are ordered (typically by their x-axis value) and joined with straight line segments. Often used to visualize a trend in data over intervals of time – a time series – thus the line is often drawn chronologically. A log-log chart spanning more than one order of magnitude along both axes Semi-log or log-log (non-linear) charts x position y position symbol/glyph color connections Represents data as lines or series of points spanning large ranges on one or both axes One or both axes are represented using a non-linear logarithmic scale Streamgraph Streamgraph (type of area chart) width color time (flow) A type of stacked area chart that is displaced around a central axis, resulting in a flowing shape. Unlike a traditional stacked area chart in which the layers are stacked on top of an axis, in a streamgraph the layers are positioned to minimize their "wiggle". Streamgraphs display data with only positive values, and are not able to represent both negative and positive values. Example: the visual shows music listened to by a user over time Treemap Treemap size color Is a method for displaying hierarchical data using nested figures, usually rectangles. For example, disk space by location / file type Gantt chart Gantt chart color time (flow) Type of bar chart that illustrates a project schedule Modern Gantt charts also show the dependency relationships between activities and current schedule status. For example, used in project planning Heat map Heat map color categorical variable Represents the magnitude of a phenomenon as color in two dimensions. There are two categories of heat maps: cluster heat map: where magnitudes are laid out into a matrix of fixed cell size whose rows and columns are categorical data. For example, the graph to the right. spatial heat map: where no matrix of fixed cell size for example a heat-map. For example, a heat map showing population densities displayed on a geographical map Stripe graphic Stripe graphic x position color A sequence of colored stripes visually portrays trend of a data series. Portrays a single variable—prototypically temperature over time to portray global warming Deliberately minimalist—with no technical indicia—to communicate intuitively with non-scientists[57] Can be "stacked" to represent plural series (example) Animated spiral graphic Animated spiral graphic radial distance (dependent variable) rotating angle (cycling through months) color (passing years) Portrays a single dependent variable—prototypically temperature over time to portray global warming Dependent variable is progressively plotted along a continuous "spiral" determined as a function of (a) constantly rotating angle (twelve months per revolution) and (b) evolving color (color changes over passing years)[58] Box and whisker plot Box and Whisker Plot x axis y axis A method for graphically depicting groups of numerical data through their quartiles. Box plots may also have lines extending from the boxes (whiskers) indicating variability outside the upper and lower quartiles. Outliers may be plotted as individual points. The two boxes graphed on top of each other represent the middle 50% of the data, with the line separating the two boxes identifying the median data value and the top and bottom edges of the boxes represent the 75th and 25th percentile data points respectively. Box plots are non-parametric: they display variation in samples of a statistical population without making any assumptions of the underlying statistical distribution, thus are useful for getting an initial understanding of a data set. For example, comparing the distribution of ages between a group of people (e.g., male and females). Flowchart Flowchart workflow or process Represents a workflow, process or a step-by-step approach to solving a task. The flowchart shows the steps as boxes of various kinds, and their order by connecting the boxes with arrows. For example, outlying the actions to undertake if a lamp is not working, as shown in the diagram to the right. Radar chart Radar chart attributes value assigned to attributes Displays multivariate data in the form of a two-dimensional chart of three or more quantitative variables represented on axes starting from the same point. The relative position and angle of the axes is typically uninformative, but various heuristics, such as algorithms that plot data as the maximal total area, can be applied to sort the variables (axes) into relative positions that reveal distinct correlations, trade-offs, and a multitude of other comparative measures. For example, comparing attributes/skills (e.g., communication, analytical, IT skills) learnt across different university degrees (e.g., mathematics, economics, psychology) Venn diagram Venn diagram all possible logical relations between a finite collection of different sets. Shows all possible logical relations between a finite collection of different sets. These diagrams depict elements as points in the plane, and sets as regions inside closed curves. A Venn diagram consists of multiple overlapping closed curves, usually circles, each representing a set. The points inside a curve labelled S represent elements of the set S, while points outside the boundary represent elements not in the set S. This lends itself to intuitive visualizations; for example, the set of all elements that are members of both sets S and T, denoted S ∩ T and read "the intersection of S and T", is represented visually by the area of overlap of the regions S and T. In Venn diagrams, the curves are overlapped in every possible way, showing all possible relations between the sets. Iconography of correlations Iconography of correlations No axis Solid line dotted line color Exploratory data analysis. Replace a correlation matrix by a diagram where the "remarkable" correlations are represented by a solid line (positive correlation), or a dotted line (negative correlation). Points can be coded via color. Cartogram Cladogram (phylogeny) Concept Mapping Dendrogram (classification) Information visualization reference model Grand tour Graph drawing HyperbolicTree Multidimensional scaling Parallel coordinates Problem solving environment Further information: Interactive visualization Interactive data visualization enables direct actions on a graphical plot to change elements and link between multiple plots.[59] Interactive data visualization has been a pursuit of statisticians since the late 1960s. Examples of the developments can be found on the American Statistical Association video lending library.[60] Common interactions include: Brushing: works by using the mouse to control a paintbrush, directly changing the color or glyph of elements of a plot. The paintbrush is sometimes a pointer and sometimes works by drawing an outline of sorts around points; the outline is sometimes irregularly shaped, like a lasso. Brushing is most commonly used when multiple plots are visible and some linking mechanism exists between the plots. There are several different conceptual models for brushing and a number of common linking mechanisms. Brushing scatterplots can be a transient operation in which points in the active plot only retain their new characteristics. At the same time, they are enclosed or intersected by the brush, or it can be a persistent operation, so that points retain their new appearance after the brush has been moved away. Transient brushing is usually chosen for linked brushing, as we have just described. Painting: Persistent brushing is useful when we want to group the points into clusters and then proceed to use other operations, such as the tour, to compare the groups. It is becoming common terminology to call the persistent operation painting, Identification: which could also be called labeling or label brushing, is another plot manipulation that can be linked. Bringing the cursor near a point or edge in a scatterplot, or a bar in a barchart, causes a label to appear that identifies the plot element. It is widely available in many interactive graphics, and is sometimes called mouseover. Scaling: maps the data onto the window, and changes in the area of the. mapping function help us learn different things from the same plot. Scaling is commonly used to zoom in on crowded regions of a scatterplot, and it can also be used to change the aspect ratio of a plot, to reveal different features of the data. Linking: connects elements selected in one plot with elements in another plot. The simplest kind of linking, one-to-one, where both plots show different projections of the same data, and a point in one plot corresponds to exactly one point in the other. When using area plots, brushing any part of an area has the same effect as brushing it all and is equivalent to selecting all cases in the corresponding category. Even when some plot elements represent more than one case, the underlying linking rule still links one case in one plot to the same case in other plots. Linking can also be by categorical variable, such as by a subject id, so that all data values corresponding to that subject are highlighted, in all the visible plots. There are different approaches on the scope of data visualization. One common focus is on information presentation, such as Friedman (2008). Friendly (2008) presumes two main parts of data visualization: statistical graphics, and thematic cartography.[61] In this line the "Data Visualization: Modern Approaches" (2007) article gives an overview of seven subjects of data visualization:[62] Articles & resources Displaying connections Displaying data Displaying news Displaying websites Mind maps Tools and services All these subjects are closely related to graphic design and information representation. On the other hand, from a computer science perspective, Frits H. Post in 2002 categorized the field into sub-fields:[27][63] Information visualization Interaction techniques and architectures Modelling techniques Multiresolution methods Visualization algorithms and techniques Volume visualization Within The Harvard Business Review, Scott Berinato developed a framework to approach data visualisation.[64] To start thinking visually, users must consider two questions; 1) What you have and 2) what you're doing. The first step is identifying what data you want visualised. It is data-driven like profit over the past ten years or a conceptual idea like how a specific organisation is structured. Once this question is answered one can then focus on whether they are trying to communicate information (declarative visualisation) or trying to figure something out (exploratory visualisation). Scott Berinato combines these questions to give four types of visual communication that each have their own goals.[64] These four types of visual communication are as follows; idea illustration (conceptual & declarative).[64] Used to teach, explain and/or simply concepts. For example, organisation charts and decision trees. idea generation (conceptual & exploratory).[64] Used to discover, innovate and solve problems. For example, a whiteboard after a brainstorming session. visual discovery (data-driven & exploratory).[64] Used to spot trends and make sense of data. This type of visual is more common with large and complex data where the dataset is somewhat unknown and the task is open-ended. everyday data-visualisation (data-driven & declarative).[64] The most common and simple type of visualisation used for affirming and setting context. For example, a line graph of GDP over time. Data and information visualization insights are being applied in areas such as:[20] Scientific research Digital libraries Data mining Information graphics Financial data analysis Health care[65] Market studies Manufacturing production control Crime mapping eGovernance and Policy Modeling Digital Humanities Data Art Notable academic and industry laboratories in the field are: Adobe Research IBM Research Google Research Microsoft Research Panopticon Software Scientific Computing and Imaging Institute Tableau Software University of Maryland Human-Computer Interaction Lab Conferences in this field, ranked by significance in data visualization research,[66] are: IEEE Visualization: An annual international conference on scientific visualization, information visualization, and visual analytics. Conference is held in October. ACM SIGGRAPH: An annual international conference on computer graphics, convened by the ACM SIGGRAPH organization. Conference dates vary. Conference on Human Factors in Computing Systems (CHI): An annual international conference on human–computer interaction, hosted by ACM SIGCHI. Conference is usually held in April or May. Eurographics: An annual Europe-wide computer graphics conference, held by the European Association for Computer Graphics. Conference is usually held in April or May. For further examples, see: Category:Computer graphics organizations This section may lend undue weight to certain ideas, incidents, or controversies. Please help improve it by rewriting it to create a more balanced presentation. Discuss and resolve this issue before removing this message. (February 2021) This section does not cite any sources. Please help improve this section by adding citations to reliable sources. Unsourced material may be challenged and removed. (March 2022) (Learn how and when to remove this message) A data visualization from social media Data presentation architecture (DPA) is a skill-set that seeks to identify, locate, manipulate, format and present data in such a way as to optimally communicate meaning and proper knowledge. Historically, the term data presentation architecture is attributed to Kelly Lautt:[a] "Data Presentation Architecture (DPA) is a rarely applied skill set critical for the success and value of Business Intelligence. Data presentation architecture weds the science of numbers, data and statistics in discovering valuable information from data and making it usable, relevant and actionable with the arts of data visualization, communications, organizational psychology and change management in order to provide business intelligence solutions with the data scope, delivery timing, format and visualizations that will most effectively support and drive operational, tactical and strategic behaviour toward understood business (or organizational) goals. DPA is neither an IT nor a business skill set but exists as a separate field of expertise. Often confused with data visualization, data presentation architecture is a much broader skill set that includes determining what data on what schedule and in what exact format is to be presented, not just the best way to present data that has already been chosen. Data visualization skills are one element of DPA." DPA has two main objectives: To use data to provide knowledge in the most efficient manner possible (minimize noise, complexity, and unnecessary data or detail given each audience's needs and roles) To use data to provide knowledge in the most effective manner possible (provide relevant, timely and complete data to each audience member in a clear and understandable manner that conveys important meaning, is actionable and can affect understanding, behavior and decisions) With the above objectives in mind, the actual work of data presentation architecture consists of: Creating effective delivery mechanisms for each audience member depending on their role, tasks, locations and access to technology Defining important meaning (relevant knowledge) that is needed by each audience member in each context Determining the required periodicity of data updates (the currency of the data) Determining the right timing for data presentation (when and how often the user needs to see the data) Finding the right data (subject area, historical reach, breadth, level of detail, etc.) Utilizing appropriate analysis, grouping, visualization, and other presentation formats DPA work shares commonalities with several other fields, including: Business analysis in determining business goals, collecting requirements, mapping processes. Business process improvement in that its goal is to improve and streamline actions and decisions in furtherance of business goals Data visualization in that it uses well-established theories of visualization to add or highlight meaning or importance in data presentation. Digital humanities explores more nuanced ways of visualising complex data. Information architecture, but information architecture's focus is on unstructured data and therefore excludes both analysis (in the statistical/data sense) and direct transformation of the actual content (data, for DPA) into new entities and combinations. HCI and interaction design, since many of the principles in how to design interactive data visualisation have been developed cross-disciplinary with HCI. Visual journalism and data-driven journalism or data journalism: Visual journalism is concerned with all types of graphic facilitation of the telling of news stories, and data-driven and data journalism are not necessarily told with data visualisation. Nevertheless, the field of journalism is at the forefront in developing new data visualisations to communicate data. Graphic design, conveying information through styling, typography, position, and other aesthetic concerns. Analytics Big data Climate change art Computational visualistics Information art Data management Data physicalization Data Presentation Architecture Data profiling Data warehouse Geovisualization Grand Tour (data visualisation) imc FAMOS (1987), graphical data analysis Infographics Information design Information management List of graphical methods List of information graphics software List of countries by economic complexity, example of Treemapping List of mathematical art software Patent visualisation Software visualization Statistical analysis Visual analytics Warming stripes ^ The first formal, recorded, public usages of the term data presentation architecture were at the three formal Microsoft Office 2007 Launch events in Dec, Jan and Feb of 2007–08 in Edmonton, Calgary and Vancouver (Canada) in a presentation by Kelly Lautt describing a business intelligence system designed to improve service quality in a pulp and paper company. The term was further used and recorded in public usage on December 16, 2009 in a Microsoft Canada presentation on the value of merging Business Intelligence with corporate collaboration processes.

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For more information, please see our Cookie Notice and our Privacy Policy. , the free encyclopedia that anyone can edit. 110,331 active editors 7,023,126 articles in English School in Sketty, Swansea, photographed in 1854 The period between 1701 and 1870 saw an expansion in access to formal education in Wales, though schooling was not yet universal. Several philanthropic efforts were made to provide education to the poor during the 18th century. In the early to mid-19th century, charitable schools were established to provide a basic education. Private schools aimed at the working classes also existed. State funding was introduced to schools from 1833. Some use of the Welsh language was made in 18th-century philanthropic education, at a time when most agricultural workers in Wales spoke only Welsh. In the 19th century, public opinion was keen for children to learn English, and many schools punished children for speaking Welsh, though studies found such methods ineffective. The government did little to promote bilingual education. Grammar schools experienced difficulties and, by the end of the period, secondary education was limited. Dissenter academies and theological colleges offered higher education. (Full article...) Recently featured: White dwarf Battle of Groix Scott Carpenter Archive By email More featured articles About T. brachyglossum seedheads ... that Taraxacum brachyglossum (pictured) can reproduce both sexually and asexually, depending on environmental conditions? ... that although Frederick Rondel was taught to paint by a French king's court painter, he chose to depict American landscapes like the Adirondack Mountains? ... that a 19th-century water-pumping station is now a wedding venue? ... that Washington University in St. Louis holds one of the few surviving printed broadsides of the United States Declaration of Independence? ... that Jerzy Broszkiewicz, a louse-feeder during World War II, later became a writer of youth literature and drama? ... that Lorde wrote a song about herself titled "Man of the Year" the day after attending GQ's "Men of the Year" party in 2023? ... that American football player Curtis Burrow, the fourth different kicker used by the Green Bay Packers in 1988, played one game before being released? ... that Bukit Brown Cemetery is believed to be the largest Chinese cemetery outside of China, with over 100,000 burials? ... that an eight-week UK number-one single co-written by Audrey Hobert has a sexually explicit version? Archive Start a new article Nominate an article Vera Rubin Observatory The Vera C. Rubin Observatory (pictured) in Chile releases the first light images from its new 8.4-meter (28 ft) telescope. In basketball, the Oklahoma City Thunder defeat the Indiana Pacers to win the NBA Finals. An attack on a Greek Orthodox church in Damascus, Syria, kills at least 25 people. The United States conducts military strikes on three nuclear facilities in Iran. In rugby union, the Crusaders defeat the Chiefs to win the Super Rugby Pacific final. Ongoing: Gaza war Iran–Israel war Russian invasion of Ukraine timeline Sudanese civil war timeline Recent deaths: Lucien Nedzi Anne Burrell Frederick W. Smith Ron Taylor Mohammad Kazemi Marita Camacho Quirós Nominate an article June 25 Original rainbow flag 1658 – Anglo-Spanish War: The largest battle ever fought on Jamaica, the three-day Battle of Rio Nuevo, began. 1910 – The United States Congress passed the Mann Act, which prohibited the interstate transport of females for "immoral purposes". 1944 – World War II: U.S. Navy and Royal Navy ships bombarded Cherbourg, France, to support U.S. Army units engaged in the Battle of Cherbourg. 1978 – The rainbow flag (original version pictured) representing gay pride was first flown at the San Francisco Gay Freedom Day parade. 2009 – Singer Michael Jackson died as a result of the combination of drugs in his body. Giovanni Battista Riccioli (d. 1671)Eloísa Díaz (b. 1866)George Michael (b. 1963)Farrah Fawcett (d. 2009) More anniversaries: June 24 June 25 June 26 Archive By email List of days of the year About 1795 Turban Head eagle with original reverse 1797 Turban Head eagle with heraldic eagle reverse The Turban Head eagle was a ten-dollar gold piece, or eagle, struck by the United States Mint from 1795 to 1804. The piece was designed by Robert Scot, and was the first in the eagle series, which continued until the Mint ceased striking gold coins for circulation in 1933. The common name is a misnomer; Liberty does not wear a turban but a cap, believed by some to be a pileus or Liberty cap: her hair twisting around the headgear makes it appear to be a turban. The number of stars on the obverse was initially intended to be equal to the number of states in the Union, but with the number at 16, that idea was abandoned in favor of using 13 stars in honor of the original states. The initial reverse, featuring an eagle with a wreath in its mouth, proved unpopular and was replaced by a heraldic eagle. Increases in the price of gold made it profitable for the coins to be melted down, and in 1804, President Thomas Jefferson ended coinage of eagles; the denomination was not struck again for circulation for more than 30 years. These Turban Head eagles are in the National Numismatic Collection at the National Museum of American History. Coin design credit: United States Mint; photographed by Jaclyn Nash Recently featured: Springbok Geraldine Ulmar Shah Mosque (Isfahan) Archive More featured pictures Community portal – The central hub for editors, with resources, links, tasks, and announcements. Village pump – Forum for discussions about Wikipedia itself, including policies and technical issues. Site news – Sources of news about Wikipedia and the broader Wikimedia movement. Teahouse – Ask basic questions about using or editing Wikipedia. Help desk – Ask questions about using or editing Wikipedia. Reference desk – Ask research questions about encyclopedic topics. Content portals – A unique way to navigate the encyclopedia. Wikipedia is written by volunteer editors and hosted by the Wikimedia Foundation, a non-profit organization that also hosts a range of other volunteer projects: CommonsFree media repository MediaWikiWiki software development Meta-WikiWikimedia project coordination WikibooksFree textbooks and manuals WikidataFree knowledge base WikinewsFree-content news WikiquoteCollection of quotations WikisourceFree-content library WikispeciesDirectory of species WikiversityFree learning tools WikivoyageFree travel guide WiktionaryDictionary and thesaurus This Wikipedia is written in English. Many other Wikipedias are available; some of the largest are listed below. 1,000,000+ articles العربية Deutsch Español فارسی Français Italiano Nederlands 日本語 Polski Português Русский Svenska Українська Tiếng Việt 中文 250,000+ articles Bahasa Indonesia Bahasa Melayu Bân-lâm-gú Български Català Čeština Dansk Eesti Ελληνικά Esperanto Euskara עברית Հայերեն Magyar Norsk bokmål Română Simple English Slovenčina Srpski Srpskohrvatski Suomi Türkçe Oʻzbekcha 50,000+ articles Asturianu Azərbaycanca □□□□□ Bosanski کوردی Frysk Gaeilge Galego Hrvatski ქართული Kurdî Latviešu Lietuvių □□□□□□ Македонски □□□□□□□□□□ Norsk nynorsk □□□□□□ Shqip Slovenščina □□□ □□□□□□ اردو Retrieved from " 2 This article needs additional citations for verification. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed.Find sources: "1658" – news · newspapers · books · scholar · JSTOR (January 2016) (Learn how and when to remove this message) Calendar year Years Millennium 2nd millennium Centuries 16th century 17th century 18th century Decades 1630s 1640s 1650s 1660s 1670s Years 1655 1656 1657 1658 1659 1660 1661 vte January 30: Swedish troops cross the frozen waters of the Danish straits on foot in the March Across the Belts 1658 by topic Arts and science Architecture Art Literature Music Science Leaders State leaders Colonial governors Religious leaders Birth and death categories Births – Deaths Establishments and disestablishments categories Establishments – Disestablishments Works category Works vte 1658 in various calendarsGregorian calendar1658MDCLVIIIAb urbe condita2411Armenian calendar1107ԹՎ ՌՃԷAssyrian calendar6408Balinese saka calendar1579–1580Bengali calendar1064–1065Berber calendar2608English Regnal year9 Cha. 2 – 10 Cha. 2(Interregnum)Buddhist calendar2202Burmese calendar1020Byzantine calendar7166–7167Chinese calendar丁酉年 (Fire Rooster)4355 or 4148 — to —戊戌年 (Earth Dog)4356 or 4149Coptic calendar1374–1375Discordian calendar2824Ethiopian calendar1650–1651Hebrew calendar5418–5419Hindu calendars - Vikram Samvat1714–1715 - Shaka Samvat1579–1580 - Kali Yuga4758–4759Holocene calendar11658Igbo calendar658–659Iranian calendar1036–1037Islamic calendar1068–1069Japanese calendarMeireki 4 / Manji 1(万治元年)Javanese calendar1580–1581Julian calendarGregorian minus 10 daysKorean calendar3991Minguo calendar254 before ROC民前254年Nanakshahi calendar190Thai solar calendar2200–2201Tibetan calendar阴火鸡年(female Fire-Rooster)1784 or 1403 or 631 — to —阳土狗年(male Earth-Dog)1785 or 1404 or 632 June 14: Battle of the Dunes 1658 (MDCLVIII) was a common year starting on Tuesday of the Gregorian calendar and a common year starting on Friday of the Julian calendar, the 1658th year of the Common Era (CE) and Anno Domini (AD) designations, the 658th year of the 2nd millennium, the 58th year of the 17th century, and the 9th year of the 1650s decade. As of the start of 1658, the Gregorian calendar was 10 days ahead of the Julian calendar, which remained in localized use until 1923. Calendar year January 13 – Edward Sexby, who had plotted against Oliver Cromwell, dies in the Tower of London.[1] January 30 – The "March Across the Belts" (Tåget över Bält), Sweden's use of winter weather to send troops across the waters of the Danish straits at a time when winter has turned them to ice, begins. Within 17 days, Sweden's King Karl X Gustav leads troops across the ice belts to capture six of Denmark's islands as Swedish territory. February 5 – Prince Muhi al-Din Muhammad, one of the sons of India's Mughal, Emperor Shah Jahan, proclaims himself Emperor after Jahan names Muhi's older brother, Dara Shikoh, as regent, and departs from Aurangabad with troops. February 6 – Swedish troops of Charles X Gustav of Sweden cross The Great Belt in Denmark, over frozen sea.[2] March 8 (February 26 OS) – The peace between Sweden and Denmark-Norway is concluded in Roskilde by the Treaty of Roskilde, under which Denmark is forced to cede significant territory. This leads to Sweden reaching its territorial height during its time as a great power. April 15 – In India, the Battle of Dharmat is fought in the modern-day state of Madhya Pradesh between rival claimants to the throne of the Mughal Empire. Prince Muhi al-Din Muhammad, the son of the Emperor Shah Jahan, leads 30,000 men in a triumph over 22,000 troops led by Jaswant Singh of Marwar and Ratan Singh Rathore. Despite heavy losses, with more than 11,000 casualties, Prince Muhi, who has adopted the name Aurangzeb, continues toward Samugarh and Agra and captures the throne at the end of July. April 16 – In Skåneland, a region recently ceded by Denmark to the Swedish Empire, representatives of the nobility of the provinces of Blekinge, Halland and Scania gather at the Scanian city of Malmö to swear their allegiance to King Charles X Gustav of Sweden. May 1 – Hydriotaphia, Urn Burial and The Garden of Cyrus are published by Thomas Browne in England. May 29 – Aurangzeb wins the Battle of Samugarh as Indian Mughal regent Dara Shikoh makes a last effort to defend the Mughal capital Agra. June 3 – Pope Alexander VII appoints François de Laval vicar apostolic of New France. June 14 – Anglo-Spanish War (1654–60) and Franco-Spanish War (1635–59): In the Battle of the Dunes, a Spanish force attempting to lift a siege of Dunkirk is defeated by the French and English. England is then given Dunkirk, for its assistance in the victory. June 25–27 – In the Battle of Rio Nuevo, part of the Anglo-Spanish War, a Spanish invasion force fails to recapture Jamaica from the English. July 2 – The Siege of Toruń begins in Poland as troops of the Polish–Lithuanian Commonwealth and of Austria seek to recapture the city of Toruń from a garrison of the Swedish Army. Within six months, the Swedish occupiers surrender. July 18 – Prince Leopold of the House of Habsburg, son of the late Ferdinand III, is elected as the new Holy Roman Emperor. July 31 – After Shah Jahan completes the Taj Mahal, his son Aurangzeb deposes him as ruler of the Mughal Empire. July – Šarhūda's Manchu fleet annihilates Onufriy Stepanov's Russian flotilla, on the Amur River. August 1 – The coronation of Leopold I takes place in Frankfurt. August 5 – Just six months after winning territory from Denmark-Norway in war and subsequent treaty, Sweden's King Charles X Gustav declares a second war against Denmark. By August 11, the King's troops have surrounded Denmark's capital, Copenhagen, while the Swedish Navy blocks the harbor to prevent the city from being resupplied, and begins bombardment. August 14 – The League of the Rhine (Rheinische Allianz) is formed by 50 German princes whose cities are on the Rhine river. September 3 – Oliver Cromwell dies and his son Richard assumes his father's position as Lord Protector of England, Scotland and Ireland. September 17 – Portuguese Restoration War: In the Battle of Vilanova, a Spanish army, having crossed the Minho, defeats the Portuguese. October 7 – The Netherlands enters the Dano-Swedish War to come to the rescue of Denmark, sending a 45-ship fleet from Vlie. October 29 – The 45-ship fleet of the Netherlands arrives at Denmark and begins its counterattack on Sweden's army and navy with three squadrons. November 6 – The Mexican Inquisition carries out the execution, by public burning, of 14 men convicted of homosexuality, while another 109 arrested are either released or given less harsh sentences. November 8 (October 29 old style) – The Battle of the Sound takes place between the navies of the Dutch Republic (with 41 warships) and of Sweden (with 45) at the Øresund, a strait between Denmark and Sweden's newly-acquired territory, the former Danish island of Scania. The Dutch Republic is successful at breaking the Swedish Navy's blockade of Copenhagen, and Sweden is forced to retreat, bringing an end to the attempted conquest of Denmark. November 23 – The elaborate funeral of Lord Protector of England Oliver Cromwell (who had died on September 3 and was buried at Westminster Abbey two weeks later) is carried out in London. A little more than two years later (in January 1661), his body will be disinterred and his head severed and placed on a spike. December 11 – Abaza Hasan Pasha, an Ottoman provincial governor who is attempting to depose the Grand Vizier, wins a battle at the Turkish city of Ilgin, defeating loyalist forces led by Murtaza Pasha. The victory is the last for the rebels. Two months later (February 16, 1659) Abaza Hasan is assassinated after being invited to peace negotiations by the loyalists. December 20 – Representatives of the Russian Empire and the Swedish Empire sign the Treaty of Valiesar at the Valiesar Estate near Narva, part of modern-day Estonia. In return for ceasing hostilities between the two empires in the Second Northern War, Russia is allowed to keep captured territories in Livonia (part of modern-day Latvia) for a term of three years. December 25 – Polish and Danish forces defeat a Swedish Army in the Battle of Kolding in Denmark. December 30 – The Siege of Toruń ends almost six months after it started, with Poland recapturing the city from Sweden. Portuguese traders are expelled from Ceylon by Dutch invaders. The Dutch in the Cape Colony start to import slaves from India and South-East Asia (later from Madagascar). Mary of Modena January 9 – Nicolas Coustou, French artist (d. 1733)[3] January 17 – Samson Wertheimer, European rabbi (d. 1724) January 17 – Francis Seymour, 5th Duke of Somerset (d. 1678) February 18 – Charles-Irénée Castel de Saint-Pierre, French writer (d. 1743) March 5 – Antoine de la Mothe Cadillac, French explorer (d. 1730) March 8 – Thomas Trevor, 1st Baron Trevor, British Baron (d. 1730) March 23 – Jean-Baptiste Santerre, French painter (d. 1717) March 30 – Muro Kyūsō, Japanese Neo-Confucian scholar (d. 1734) April 11 – James Hamilton, 4th Duke of Hamilton, Scottish peer (d. 1712) April 19 – Johann Wilhelm, Elector Palatine, German noble (d. 1716) April 22 – Giuseppe Torelli, Italian violist, violinist, pedagogue and composer (d. 1709) May 30 – Sir Henry Furnese, 1st Baronet, English merchant and politician (d. 1712) June 10 – John March, Massachusetts businessman, colonel (d. 1712) June 11 – Victor Honoré Janssens, Flemish painter (d. 1736) June 22 – Louis VII, Landgrave of Hesse-Darmstadt (d. 1678) July 10 – Luigi Ferdinando Marsili, Italian soldier and naturalist (d. 1730) July 14 – Camillo Rusconi, Italian artist (d. 1728) July 17 – Diogo de Mendonça Corte-Real, Portuguese politician (d. 1736) July 21 – Alexis Littré, French physician and anatomist (d. 1726) July 25 – Archibald Campbell, 1st Duke of Argyll, Scottish privy councillor (d. 1703) July 28 – Roelof Diodati, Dutch Governor of Mauritius (d. 1723) August 1 – Pierre Joseph Garidel, French botanist (d. 1737) August 5 – Claude Audran III, French painter (d. 1734) August 10 – Susanne Maria von Sandrart, German engraver (d. 1716) August 11 – Sir Justinian Isham, 4th Baronet, English baronet and Member of Parliament (d. 1730) August 16 – Jan Frans van Son, Flemish Baroque painter (d. 1704) August 16 – Ralph Thoresby, British historian (d. 1725) August 18 – Jan František Beckovský, Czech historian (d. 1722) August 22 – John Ernest IV, Duke of Saxe-Coburg-Saalfeld (d. 1729) August 28 – Honoré Tournély, French theologian (d. 1729) September 1 – Jacques Bernard, French theologian and publicist (d. 1718) September 16 – John Dennis, English dramatist and critic (d. 1734) September 24 – Sir Robert Anstruther, 1st Baronet, Scottish politician (d. 1737) September 30 – Elisabeth Eleonore of Brunswick-Wolfenbüttel, Duchess consort of Saxe-Meiningen (d. 1729) October 2 – Nicholas Roosevelt (1658–1742), Dutch-American politician (d. 1742) October 5 – Mary of Modena, queen of James II of England (d. 1718) October 11 – Christian Heinrich Postel, German jurist (d. 1705) October 18 – Alexander of Courland, German prince (d. 1686) October 19 – Adolphus Frederick II, Duke of Mecklenburg-Strelitz (d. 1704) October 21 – Henri de Boulainvilliers, French nobleman (d. 1722) October 24 – Marko Gerbec, Carniolan physician, scientist (d. 1718) November 2 – Baptist Noel (MP), English politician (d. 1690) November 4 – Sulkhan-Saba Orbeliani, Georgian prince, writer, monk and author (d. 1725) November 21 – Johann Gottfried Roesner, Prussian burgomaster (d. 1724) November 27 – Tsarevna Catherine Alekseyevna of Russia, daughter of Tsar Alexis of Russia (d. 1718) November 27 – Hercule-Louis Turinetti, marquis of Prié (d. 1726) December 2 – Sir Thomas Roberts, 4th Baronet, English politician (d. 1706) December 10 – Lancelot Blackburne, Archbishop of York (d. 1743) date unknown – Elizabeth Barry, English actress (d. 1713) John Cleveland Witte Corneliszoon de With January 1 – Caspar Sibelius, Dutch Protestant minister (b. 1590) January 2 – Sir William Armine, 2nd Baronet, English politician (b. 1622) January 7 – Theophilus Eaton, English-born Connecticut colonist (b. 1590) January 13 – Edward Sexby, English Puritan soldier (b. 1616) February 19 – Henry Wilmot, 1st Earl of Rochester (b. 1612) March 25 – Herman IV, Landgrave of Hesse-Rotenburg (b. 1607) February 27 – Adolf Frederick I, Duke of Mecklenburg-Schwerin (1592–1628 and again 1631–1658) (b. 1588) March 29 – Bertuccio Valiero, Doge of Venice (b. 1596) April 7 – Juan Eusebio Nieremberg, Spanish mystic (b. 1595) April 19 Kirsten Munk, second wife of Christian IV of Denmark (b. 1598) Robert Rich, 2nd Earl of Warwick, English colonial administrator and admiral (b. 1587) April 24 – Francesco Maria Richini, Italian architect (b. 1584) April 29 – John Cleveland, English poet (b. 1613) May 20 – Bartholomew Holzhauser, German priest, visionary and writer of prophecies (b. 1613) June 18 – Louis Cappel, French Protestant churchman and scholar (b. 1585) June 8 – Sir Henry Slingsby, 1st Baronet, English baronet (b. 1602) June 27 – Ercole Gennari, Italian drawer and painter (b. 1597) July 22 – Frederick, Duke of Schleswig-Holstein-Sønderburg-Norburg (b. 1581) August 5 – Gundakar, Prince of Liechtenstein, court official in Vienna (b. 1580) August 6 – Elizabeth Claypole, daughter of Oliver Cromwell (b. 1629) August 19 – Christine of Hesse-Kassel, Duchess of Saxe-Eisenach and Saxe-Coburg (b. 1578) September 3 – Oliver Cromwell, Lord Protector of England, Scotland, and Ireland (b. 1599) September 17 – Kaspar von Barth, German philologist and writer (b. 1587) September 22 – Georg Philipp Harsdörffer, German poet (b. 1607) October 14 – Francesco I d'Este, Duke of Modena, Italian noble (b. 1610) October 23 – Thomas Pride, Parliamentarian general in the English Civil War November 4 – Antoine Le Maistre, French Jansenist (b. 1608) November 6 – Pierre du Ryer, French dramatist (b. 1606) November 7 – Maeda Toshitsune, Japanese warlord (b. 1594) November 8 – Witte de With, Dutch naval officer (b. 1599) November 26 – Duke Francis Henry of Saxe-Lauenburg (b. 1604) November 29 – Margrave Charles Magnus of Baden-Durlach (b. 1621) December 6 – Baltasar Gracián y Morales, Spanish writer (b. 1601) December 15 – Carlo Emanuele Madruzzo, Italian prince-bishop (b. 1599) December 20 – Jean Jannon, French typefounder (b. 1580) Date unknown: Osoet Pegua, Thai businesswoman (b. 1615) ^ "killing". Oxford Reference. Retrieved December 14, 2021. ^ Brems, Hans (June 1970). "Sweden: From Great Power to Welfare State". Journal of Economic Issues. 4 (2, 3). Association for Evolutionary Economics: 1–16. doi:10.1080/00213624.1970.11502941. JSTOR 4224039. A swift and brilliantly conceived march from Holstein across the frozen Danish waters on Copenhagen, by Karl X Gustav in 1658, finally wrests Bohuslin, Sk'ane, and Blekinge from Denmark-Norway. Denmark no longer controls both sides of Oresund, and Swedish power is at its peak. ^ "Nicolas Coustou | French sculptor | Britannica". www.britannica.com. Retrieved December 14, 2021. Retrieved from " 3One hundred years, from 1501 to 1600 This article needs additional citations for verification. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed.Find sources: "16th century" – news · newspapers · books · scholar · JSTOR (September 2022) (Learn how and when to remove this message) Millennia 2nd millennium Centuries 15th century 16th century 17th century Timelines 15th century 16th century 17th century State leaders 15th century 16th century 17th century Decades 1500s 1510s 1520s 1530s 1540s 1550s 1560s 1570s 1580s 1590s Categories: Births – Deaths Establishments – Disestablishments vte The world map by the Italian Amerigo Vespucci (from whose name the word America is derived) and Belgian Gerardus Mercator shows (besides the classical continents Europe, Africa, and Asia) the Americas as America sive India Nova', New Guinea, and other islands of Southeast Asia, as well as a hypothetical Arctic continent and a yet undetermined Terra Australis.[1]The 16th century began with the Julian year 1501 (represented by the Roman numerals MDI) and ended with either the Julian or the Gregorian year 1600 (MDC), depending on the reckoning used (the Gregorian calendar introduced a lapse of 10 days in October 1582).[1] The Renaissance in Italy and Europe saw the emergence of important artists, authors and scientists, and led to the foundation of important subjects which include accounting and political science. Copernicus proposed the heliocentric universe, which was met with strong resistance, and Tycho Brahe refuted the theory of celestial spheres through observational measurement of the 1572 appearance of a Milky Way supernova. These events directly challenged the long-held notion of an immutable universe supported by Ptolemy and Aristotle, and led to major revolutions in astronomy and science. Galileo Galilei became a champion of the new sciences, invented the first thermometer and made substantial contributions in the fields of physics and astronomy, becoming a major figure in the Scientific Revolution in Europe. Spain and Portugal colonized large parts of Central and South America, followed by France and England in Northern America and the Lesser Antilles. The Portuguese became the masters of trade between Brazil, the coasts of Africa, and their possessions in the Indies, whereas the Spanish came to dominate the Greater Antilles, Mexico, Peru, and opened trade across the Pacific Ocean, linking the Americas with the Indies. English and French privateers began to practice persistent theft of Spanish and Portuguese treasures. This era of colonialism established mercantilism as the leading school of economic thought, where the economic system was viewed as a zero-sum game in which any gain by one party required a loss by another. The mercantilist doctrine encouraged the many intra-European wars of the period and arguably fueled European expansion and imperialism throughout the world until the 19th century or early 20th century. The Reformation in central and northern Europe gave a major blow to the authority of the papacy and the Catholic Church. In England, the British-Italian Alberico Gentili wrote the first book on public international law and divided secularism from canon law and Catholic theology. European politics became dominated by religious conflicts, with the groundwork for the epochal Thirty Years' War being laid towards the end of the century. In the Middle East, the Ottoman Empire continued to expand, with the sultan taking the title of caliph, while dealing with a resurgent Persia. Iran and Iraq were caught by a major popularity of the Shia sect of Islam under the rule of the Safavid dynasty of warrior-mystics, providing grounds for a Persia independent of the majority-Sunni Muslim world.[2] In the Indian subcontinent, following the defeat of the Delhi Sultanate and Vijayanagara Empire, new powers emerged, the Sur Empire founded by Sher Shah Suri, Deccan sultanates, Rajput states, and the Mughal Empire[3] by Emperor Babur, a direct descendant of Timur and Genghis Khan.[4] His successors Humayun and Akbar, enlarged the empire to include most of South Asia. Japan suffered a severe civil war at this time, known as the Sengoku period, and emerged from it as a unified nation under Toyotomi Hideyoshi. China was ruled by the Ming dynasty, which was becoming increasingly isolationist, coming into conflict with Japan over the control of Korea as well as Japanese pirates. In Africa, Christianity had begun to spread in Central Africa and Southern Africa. Until the Scramble for Africa in the late 19th century, most of Africa was left uncolonized. For timelines of earlier events, see 15th century and Timeline of the Middle Ages. Main article: 1500s Mona Lisa, by Leonardo da Vinci, c. 1503–1506, one of the world's best-known paintings 1501: Michelangelo returns to his native Florence to begin work on the statue David. 1501: Safavid dynasty reunifies Iran and rules over it until 1736. Safavids adopt a Shia branch of Islam.[5] 1501: First Battle of Cannanore between the Third Portuguese Armada and Kingdom of Cochin under João da Nova and Zamorin of Kozhikode's navy marks the beginning of Portuguese conflicts in the Indian Ocean. 1502: First reported African slaves in the New World 1502: The Crimean Khanate sacks Sarai in the Golden Horde, ending its existence. 1503: Spain defeats France at the Battle of Cerignola. Considered to be the first battle in history won by gunpowder small arms. 1503: Leonardo da Vinci begins painting the Mona Lisa and completes it three years later. 1503: Nostradamus is born on either December 14 or December 21. 1504: A period of drought, with famine in all of Spain. 1504: Death of Isabella I of Castile; Joanna of Castile becomes the Queen. 1504: Foundation of the Sultanate of Sennar by Amara Dunqas, in what is modern Sudan 1505: Zhengde Emperor ascends the throne of Ming dynasty. 1505: Martin Luther enters St. Augustine's Monastery at Erfurt, Germany, on 17 July and begins his journey to instigating the Reformation. 1505: Sultan Trenggono builds the first Muslim kingdom in Java, called Demak, in Indonesia. Many other small kingdoms were established in other islands to fight against Portuguese. Each kingdom introduced local language as a way of communication and unity. 1506: Leonardo da Vinci completes the Mona Lisa. 1506: King Afonso I of Kongo wins the battle of Mbanza Kongo, resulting in Catholicism becoming Kongo's state religion.Battle of Cerignola: El Gran Capitan finds the corpse of Louis d'Armagnac, Duke of Nemours 1506: At least two thousand converted Jews are massacred in a Lisbon riot, Portugal. 1506: Christopher Columbus dies in Valladolid, Spain. 1506: Poland is invaded by Tatars from the Crimean Khanate. 1507: The first recorded epidemic of smallpox in the New World on the island of Hispaniola. It devastates the native Taíno population.[6] 1507: Afonso de Albuquerque conquered Hormuz and Muscat, among other bases in the Persian Gulf, taking control of the region at the entrance of the Gulf. 1508: The Christian-Islamic power struggle in Europe and West Asia spills over into the Indian Ocean as Battle of Chaul during the Portuguese-Mamluk War 1508–1512: Michelangelo paints the Sistine Chapel ceiling. 1509: The defeat of joint fleet of the Sultan of Gujarat, the Mamlûk Burji Sultanate of Egypt, and the Zamorin of Calicut with support of the Republic of Venice and the Ottoman Empire in Battle of Diu marks the beginning of Portuguese dominance of the Spice trade and the Indian Ocean. 1509: The Portuguese king sends Diogo Lopes de Sequeira to find Malacca, the eastern terminus of Asian trade. After initially receiving Sequeira, Sultan Mahmud Shah captures and/or kills several of his men and attempts an assault on the four Portuguese ships, which escape.[7] The Javanese fleet is also destroyed in Malacca. 1509: Krishnadevaraya ascends the throne of Vijayanagara Empire. Main article: 1510s Afonso de Albuquerque 1509–1510: The 'great plague' in various parts of Tudor England.[8] 1510: Afonso de Albuquerque of Portugal conquers Goa in India. 1511: Afonso de Albuquerque of Portugal conquers Malacca, the capital of the Sultanate of Malacca in present-day Malaysia. 1512: Copernicus writes Commentariolus, and proclaims the Sun the center of the Solar System. 1512: The southern part (historical core) of the Kingdom of Navarre is invaded by Castile and Aragon. 1512: Qutb Shahi dynasty, founded by Quli Qutb Mulk, rules Golconda Sultanate until 1687. 1512: The first Portuguese exploratory expedition was sent eastward from Malacca (in present-day Malaysia) to search for the 'Spice Islands' (Maluku) led by Francisco Serrão. Serrão is shipwrecked but struggles on to Hitu (northern Ambon) and wins the favour of the local rulers.[9] 1513: Machiavelli writes The Prince, a treatise about political philosophy 1513: The Portuguese mariner Jorge Álvares lands at Macau, China, during the Ming dynasty. 1513: Henry VIII defeats the French at the Battle of the Spurs. 1513: The Battle of Flodden Field in which invading Scots are defeated by Henry VIII's forces. 1513: Sultan Selim I ("The Grim") orders the massacre of Shia Muslims in Anatolia (present-day Turkey). 1513: Vasco Núñez de Balboa, in service of Spain arrives at the Pacific Ocean (which he called Mar del Sur) across the Isthmus of Panama. He was the first European to do so. 1514: The Battle of Orsha halts Muscovy's expansion into Eastern Europe. 1514: Dózsa rebellion (peasant revolt) in Hungary.Martin Luther initiated the Reformation with his Ninety-five Theses in 1517. 1514: The Battle of Chaldiran, the Ottoman Empire gains decisive victory against Safavid dynasty. 1515: Ascension of Francis I of France as King of France following the death of Louis XII. 1515: The Ottoman Empire wrests Eastern Anatolia from the Safavids after the Battle of Chaldiran. 1515: The Ottomans conquer the last beyliks of Anatolia, the Dulkadirs and the Ramadanids. 1516–1517: The Ottomans defeat the Mamluks and gain control of Egypt, Arabia, and the Levant. 1517: The Sweating sickness epidemic in Tudor England.[10] 1517: The Reformation begins when Martin Luther posts his Ninety-five Theses in Saxony. 1518: The Treaty of London was a non-aggression pact between the major European nations. The signatories were Burgundy, France, England, the Holy Roman Empire, the Netherlands, the Papal States and Spain, all of whom agreed not to attack one another and to come to the aid of any that were under attack. 1518: Mir Chakar Khan Rind leaves Baluchistan and settles in Punjab. 1518: Leo Africanus, also known as al-Hasan ibn Muhammad al-Wazzan al-Fasi, an Andalusian Berber diplomat who is best known for his book Descrittione dell'Africa (Description of Africa), is captured by Spanish pirates; he is taken to Rome and presented to Pope Leo X. 1518: The dancing plague of 1518 begins in Strasbourg, lasting for about one month. 1519: Leonardo da Vinci dies of natural causes on May 2.Europe at the time of the accession of Charles V in 1519 1519: Wang Yangming, the Chinese philosopher and governor of Jiangxi province, describes his intent to use the firepower of the fo-lang-ji, a breech-loading Portuguese culverin, in order to suppress the rebellion of Prince Zhu Chenhao. 1519: Barbary pirates led by Hayreddin Barbarossa, a Turk appointed to ruling position in Algiers by the Ottoman Empire, raid Provence and Toulon in southern France. 1519: Death of Emperor Maximilian; Charles I of Austria, Spain, and the Low Countries becomes Emperor of Holy Roman Empire as Charles V, Holy Roman Emperor (ruled until 1556). 1519–1522: Spanish expedition commanded by Magellan and Elcano are the first to Circumnavigate the Earth. 1519–1521: Hernán Cortés leads the Spanish conquest of the Aztec Empire. Main article: 1520s Ferdinand Magellan led the first expedition that circumnavigated the globe in 1519–1522. 1520–1566: The reign of Suleiman the Magnificent marks the zenith of the Ottoman Empire. 1520: The first European diplomatic mission to Ethiopia, sent by the Portuguese, arrives at Massawa 9 April, and reaches the imperial encampment of Emperor Dawit II in Shewa 9 October. 1520: Vijayanagara Empire forces under Krishnadevaraya defeat the Adil Shahi under at the Battle of Raichur 1520: Sultan Ali Mughayat Shah of Aceh begins an expansionist campaign capturing Daya on the west Sumatran coast (in present-day Indonesia), and the pepper and gold producing lands on the east coast. 1520: The Portuguese established a trading post in the village of Lamakera on the eastern side of Solor (in present-day Indonesia) as a transit harbour between Maluku and Malacca. 1521: Belgrade (in present-day Serbia) is captured by the Ottoman Empire. 1521: After building fortifications at Tuen Mun, the Portuguese attempt to invade Ming dynasty China, but are expelled by Chinese naval forces. 1521: Philippines encountered by Ferdinand Magellan. He was later killed in the Battle of Mactan in central Philippines in the same year. 1521: Jiajing Emperor ascended the throne of Ming dynasty, China. 1521: November, Ferdinand Magellan's expedition reaches Maluku (in present-day Indonesia) and after trade with Ternate returns to Europe with a load of cloves. 1521: Pati Unus leads the invasion of Malacca (in present-day Malaysia) against the Portuguese occupation. Pati Unus was killed in this battle, and was succeeded by his brother, sultan Trenggana. 1522: Rhodes falls to the Ottomans of Suleiman the Magnificent.[11]Sack of Rome of 1527 by Charles V's forces (painting by Johannes Lingelbach) 1522: The Portuguese ally themselves with the rulers of Ternate (in present-day Indonesia) and begin construction of a fort.[9] 1522: August, Luso-Sundanese Treaty signed between Portugal and Sunda Kingdom granted Portuguese permit to build fortress in Sunda Kelapa. 1523: Sweden gains independence from the Kalmar Union. 1523: The Cacao bean is introduced to Spain by Hernán Cortés 1524–1525: German Peasants' War in the Holy Roman Empire. 1524: Giovanni da Verrazzano is the first European to explore the Atlantic coast of North America between South Carolina and Newfoundland. 1524: Ismail I, the founder of Safavid dynasty, dies and Tahmasp I becomes king.Gun-wielding Ottoman Janissaries and defending Knights of Saint John at the siege of Rhodes in 1522, from an Ottoman manuscript 1525: Timurid Empire forces under Babur defeat the Lodi dynasty at the First Battle of Panipat, end of the Delhi Sultanate. 1525: German and Spanish forces defeat France at the Battle of Pavia, Francis I of France is captured. 1526: The Ottomans defeat the Kingdom of Hungary at the Battle of Mohács. 1526: Mughal Empire, founded by Babur. 1527: Sack of Rome with Pope Clement VII escaping and the Swiss Guards defending the Vatican being killed. The sack of the city of Rome considered the end of the Italian Renaissance. 1527: Protestant Reformation begins in Sweden. 1527: The last ruler of Majapahit falls from power. This state (located in present-day Indonesia) was finally extinguished at the hands of the Demak. A large number of courtiers, artisans, priests, and members of the royalty moved east to the island of Bali; however, the power and the seat of government transferred to Demak under the leadership of Pangeran, later Sultan Fatah. 1527: June 22, The Javanese Prince Fatahillah of the Cirebon Sultanate successfully defeated the Portuguese armed forces at the site of the Sunda Kelapa Harbor. The city was then renamed Jayakarta, meaning "a glorious victory." This eventful day came to be acknowledged as Jakarta's Founding Anniversary. 1527: Mughal Empire forces defeat the Rajput led by Rana Sanga of Mewar at the Battle of Khanwa 1529: The Austrians defeat the Ottoman Empire at the siege of Vienna. 1529: Treaty of Zaragoza defined the antimeridian of Tordesillas attributing the Moluccas to Portugal and Philippines to Spain. 1529: Imam Ahmad Gurey defeats the Ethiopian Emperor Dawit II in the Battle of Shimbra Kure, the opening clash of the Ethiopian–Adal War. Main article: 1530s Spanish conquistadors with their Tlaxcallan allies fighting against the Otomies of Metztitlan in present-day Mexico, a 16th-century codex 1531–1532: The Church of England breaks away from the Catholic Church and recognizes King Henry VIII as the head of the Church. 1531: The Inca Civil War is fought between the two brothers, Atahualpa and Huáscar. 1532: Francisco Pizarro leads the Spanish conquest of the Inca Empire. 1532: Foundation of São Vicente, the first permanent Portuguese settlement in the Americas. 1533: Anne Boleyn becomes Queen of England. 1533: Elizabeth Tudor is born. 1534: Jacques Cartier claims Canada for France. 1534: The Ottomans capture Baghdad from the Safavids. 1534: Affair of the Placards, where King Francis I becomes more active in repression of French Protestants. 1535: The Münster Rebellion, an attempt of radical, millennialist, Anabaptists to establish a theocracy, ends in bloodshed. 1535: The Portuguese in Ternate depose Sultan Tabariji (or Tabarija) and send him to Portuguese Goa where he converts to Christianity and bequeaths his Portuguese godfather Jordao de Freitas the island of Ambon.[12] Hairun becomes the next sultan. 1536: Catherine of Aragon dies in Kimbolton Castle, in England.Territorial expansion of the Ottoman Empire under Suleiman (in red and orange) 1536: In England, Anne Boleyn is beheaded for adultery and treason. 1536: Establishment of the Inquisition in Portugal. 1536: Foundation of Buenos Aires (in present-day Argentina) by Pedro de Mendoza. 1537: The Portuguese establish Recife in Pernambuco, north-east of Brazil. 1537: William Tyndale's partial translation of the Bible into English is published, which would eventually be incorporated into the King James Bible. 1538: Gonzalo Jiménez de Quesada founds Bogotá. 1538: Spanish–Venetian fleet is defeated by the Ottoman Turks at the Battle of Preveza. 1539: Hernando de Soto explores inland North America. Main article: 1540s Nicolaus Copernicus 1540: The Society of Jesus, or the Jesuits, is founded by Ignatius of Loyola and six companions with the approval of Pope Paul III. 1540: Sher Shah Suri founds the Suri dynasty in South Asia, an ethnic Pashtun (Pathan) of the house of Sur, who supplanted the Mughal dynasty as rulers of North India during the reign of the relatively ineffectual second Mughal emperor Humayun. Sher Shah Suri decisively defeats Humayun in the Battle of Bilgram (May 17, 1540). 1541: Pedro de Valdivia founds Santiago in Chile. 1541: An Algerian military campaign by Charles V of Spain (Habsburg) is unsuccessful. 1541: Amazon River is encountered and explored by Francisco de Orellana. 1541: Capture of Buda and the absorption of the major part of Hungary by the Ottoman Empire. 1541: Sahib I Giray of Crimea invades Russia. 1542: The Italian War of 1542–1546 War resumes between Francis I of France and Emperor Charles V. This time Henry VIII is allied with the Emperor, while James V of Scotland and Sultan Suleiman I are allied with the French. 1542: Akbar The Great is born in the Rajput Umarkot Fort 1542: Spanish explorer Ruy López de Villalobos named the island of Samar and Leyte Las Islas Filipinas honoring Philip II of Spain and became the official name of the archipelago. 1543: Ethiopian/Portuguese troops defeat the Adal army led by Imam Ahmad Gurey at the Battle of Wayna Daga; Imam Ahmad Gurey is killed at this battle. 1543: Copernicus publishes his theory that the Earth and the other planets revolve around the Sun 1543: The Nanban trade period begins after Portuguese traders make contact with Japan. 1544: The French defeat an Imperial–Spanish army at the Battle of Ceresole.Scenes of everyday life in Ming China, by Qiu Ying 1544: Battle of the Shirts in Scotland. The Frasers and Macdonalds of Clan Ranald fight over a disputed chiefship; reportedly, 5 Frasers and 8 Macdonalds survive. 1545: Songhai forces sack the Malian capital of Niani 1545: The Council of Trent meets for the first time in Trent (in northern Italy). 1546: Michelangelo Buonarroti is made chief architect of St. Peter's Basilica. 1546: Francis Xavier works among the peoples of Ambon, Ternate and Morotai (Moro) laying the foundations for a permanent mission. (to 1547) 1547: Henry VIII dies in the Palace of Whitehall on 28 January at the age of 55. 1547: Francis I dies in the Château de Rambouillet on 31 March at the age of 52. 1547: Edward VI becomes King of England and Ireland on 28 January and is crowned on 20 February at the age of 9. 1547: Emperor Charles V decisively dismantles the Schmalkaldic League at the Battle of Mühlberg. 1547: Grand Prince Ivan the Terrible is crowned tsar of (All) Russia, thenceforth becoming the first Russian tsar. 1548: Battle of Uedahara: Firearms are used for the first time on the battlefield in Japan, and Takeda Shingen is defeated by Murakami Yoshikiyo. 1548: Askia Daoud, who reigned from 1548 to 1583, establishes public libraries in Timbuktu (in present-day Mali). 1548: The Ming dynasty government of China issues a decree banning all foreign trade and closes down all seaports along the coast; these Hai jin laws came during the Wokou wars with Japanese pirates. 1549: Tomé de Sousa establishes Salvador in Bahia, north-east of Brazil. 1549: Arya Penangsang with the support of his teacher, Sunan Kudus, avenges the death of Raden Kikin by sending an envoy named Rangkud to kill Sunan Prawoto by Keris Kyai Satan Kober (in present-day Indonesia). Main article: 1550s The Islamic gunpowder empires: Mughal Army artillerymen during the reign of Jalaluddin Akbar 1550: The architect Mimar Sinan builds the Süleymaniye Mosque in Istanbul. 1550: Mongols led by Altan Khan invade China and besiege Beijing. 1550–1551: Valladolid debate concerning the human rights of the Indigenous people of the Americas. 1551: Fifth outbreak of sweating sickness in England. John Caius of Shrewsbury writes the first full contemporary account of the symptoms of the disease. 1551: North African pirates enslave the entire population of the Maltese island Gozo, between 5,000 and 6,000, sending them to Libya. 1552: Russia conquers the Khanate of Kazan in central Asia. 1552: Jesuit China Mission, Francis Xavier dies. 1553: Mary Tudor becomes the first queen regnant of England and restores the Church of England under Papal authority. 1553: The Portuguese found a settlement at Macau. 1554: Missionaries José de Anchieta and Manuel da Nóbrega establishes São Paulo, southeast Brazil. 1554: Princess Elizabeth is imprisoned in the Tower of London upon the orders of Mary I for suspicion of being involved in the Wyatt rebellion. 1555: The Muscovy Company is the first major English joint stock trading company. 1556: Publication in Venice of Delle Navigiationi et Viaggi (terzo volume) by Giovanni Battista Ramusio, secretary of Council of Ten, with plan La Terra de Hochelaga, an illustration of the Hochelaga.[13] 1556: The Shaanxi earthquake in China is history's deadliest known earthquake during the Ming dynasty. 1556: Georgius Agricola, the "Father of Mineralogy", publishes his De re metallica. 1556: Akbar defeats Hemu at the Second battle of Panipat. 1556: Russia conquers the Astrakhan Khanate. 1556–1605: During his reign, Akbar expands the Mughal Empire in a series of conquests (in the Indian subcontinent).Political map of the world in 1556 1556: Mir Chakar Khan Rind captures Delhi with Humayun. 1556: Pomponio Algerio, radical theologian, is executed by boiling in oil as part of the Roman Inquisition. 1557: Habsburg Spain declares bankruptcy. Philip II of Spain had to declare four state bankruptcies in 1557, 1560, 1575 and 1596. 1557: The Portuguese settle in Macau (on the western side of the Pearl River Delta across from present-day Hong Kong). 1557: The Ottomans capture Massawa, all but isolating Ethiopia from the rest of the world. 1558: Elizabeth Tudor becomes Queen Elizabeth I at age 25. 1558–1603: The Elizabethan era is considered the height of the English Renaissance. 1558–1583: Livonian War between Poland, Grand Principality of Lithuania, Sweden, Denmark and Russia. 1558: After 200 years, the Kingdom of England loses Calais to France. 1559: With the Peace of Cateau Cambrésis, the Italian Wars conclude. 1559: Sultan Hairun of Ternate (in present-day Indonesia) protests the Portuguese's Christianisation activities in his lands. Hostilities between Ternate and the Portuguese. Main article: 1560s The Mughal Emperor Akbar shoots the Rajput warrior Jaimal during the Siege of Chittorgarh in 1567 1560: Ottoman navy defeats the Spanish fleet at the Battle of Djerba. 1560: Elizabeth Bathory is born in Nyirbator, Hungary. 1560: By winning the Battle of Okehazama, Oda Nobunaga becomes one of the pre-eminent warlords of Japan. 1560: Jeanne d'Albret declares Calvinism the official religion of Navarre. 1560: Lazarus Church, Macau 1561: Sir Francis Bacon is born in London. 1561: The fourth battle of Kawanakajima between the Uesugi and Takeda at Hachimanbara takes place. 1561: Guido de Bres draws up the Belgic Confession of Protestant faith. 1562: Mughal emperor Akbar reconciles the Muslim and Hindu factions by marrying into the powerful Rajput Hindu caste. 1562–1598: French Wars of Religion between Catholics and Huguenots. 1562: Massacre of Wassy and Battle of Dreux in the French Wars of Religion. 1562: Portuguese Dominican priests build a palm-trunk fortress which Javanese Muslims burned down the following year. The fort was rebuilt from more durable materials and the Dominicans commenced the Christianisation of the local population.[12] 1563: Plague outbreak claimed 80,000 people in Elizabethan England. In London alone, over 20,000 people died of the disease. 1564: Galileo Galilei born on February 15 1564: William Shakespeare baptized 26 April 1565: Deccan sultanates defeat the Vijayanagara Empire at the Battle of Talikota. 1565: Mir Chakar Khan Rind dies at aged 97. 1565: Estácio de Sá establishes Rio de Janeiro in Brazil. 1565: The Hospitallers, a Crusading Order, defeat the Ottoman Empire at the siege of Malta (1565). 1565: Miguel López de Legazpi establishes in Cebu the first Spanish settlement in the Philippines starting a period of Spanish colonization that would last over three hundred years. 1565: Spanish navigator Andres de Urdaneta discovers the maritime route from Asia to the Americas across the Pacific Ocean, also known as the tornaviaje. 1565: Royal Exchange is founded by Thomas Gresham. 1566: Suleiman the Magnificent, ruler of the Ottoman Empire, dies on September 7, during the battle of Szigetvar.Siege of Valenciennes during the Dutch War of Independence in 1567 1566–1648: Eighty Years' War between Spain and the Netherlands. 1566: Da le Balle Contrade d'Oriente, composed by Cipriano de Rore. 1567: After 45 years' reign, Jiajing Emperor died in the Forbidden City, Longqing Emperor ascended the throne of Ming dynasty. 1567: Mary, Queen of Scots, is imprisoned by Elizabeth I. 1568: The Transylvanian Diet, under the patronage of the prince John Sigismund Zápolya, the former king of Hungary, inspired by the teachings of Ferenc Dávid, the founder of the Unitarian Church of Transylvania, promulgates the Edict of Torda, the first law of freedom of religion and of conscience in the World. 1568–1571: Morisco Revolt in Spain. 1568–1600: The Azuchi-Momoyama period in Japan. 1568: Hadiwijaya sent his adopted son and son in-law Sutawijaya, who would later become the first ruler of the Mataram dynasty of Indonesia, to kill Arya Penangsang. 1569: Rising of the North in England. 1569: Mercator 1569 world map published by Gerardus Mercator. 1569: The Polish–Lithuanian Commonwealth is created with the Union of Lublin which lasts until 1795. 1569: Peace treaty signed by Sultan Hairun of Ternate and Governor Lopez De Mesquita of Portugal. Main article: 1570s The Battle of Lepanto 1570: Ivan the Terrible, tsar of Russia, orders the massacre of inhabitants of Novgorod. 1570: Pope Pius V issues Regnans in Excelsis, a papal bull excommunicating all who obeyed Elizabeth I and calling on all Catholics to rebel against her. 1570: Sultan Hairun of Ternate (in present-day Indonesia) is killed by the Portuguese.[12] Babullah becomes the next Sultan. 1570: 20,000 inhabitants of Nicosia in Cyprus were massacred and every church, public building, and palace was looted. Cyprus fell to the Ottoman Turks the following year. 1571: Pope Pius V completes the Holy League as a united front against the Ottoman Turks, responding to the fall of Cyprus to the Ottomans. 1571: The Spanish-led Holy League navy destroys the Ottoman Empire navy at the Battle of Lepanto. 1571: Crimean Tatars attack and sack Moscow, burning everything but the Kremlin. 1571: American Indians kill Spanish missionaries in what would later be Jamestown, Virginia. 1571: Spanish conquistador Miguel López de Legazpi establishes Manila, Philippines as the capital of the Spanish East Indies. 1572: Brielle is taken from Habsburg Spain by Protestant Watergeuzen in the Capture of Brielle, in the Eighty Years' War. 1572: Spanish conquistadores apprehend the last Inca leader Tupak Amaru at Vilcabamba, Peru, and execute him in Cuzco. 1572: Jeanne d'Albret dies aged 43 and is succeeded by Henry of Navarre. 1572: Catherine de' Medici instigates the St. Bartholomew's Day massacre which takes the lives of Protestant leader Gaspard de Coligny and thousands of Huguenots. The violence spreads from Paris to other cities and the countryside. 1572: First edition of the epic The Lusiads of Luís Vaz de Camões, three years after the author returned from the East.[14] 1572: The 9 years old Taizi, Zhu Yijun ascended the throne of Ming dynasty, known as Wanli Emperor. 1573: After heavy losses on both sides the siege of Haarlem ends in a Spanish victory.St. Bartholomew's Day massacre of French Protestants 1574: in the Eighty Years' War the capital of Zeeland, Middelburg declares for the Protestants. 1574: After a siege of 4 months the siege of Leiden ends in a comprehensive Dutch rebel victory. 1575: Oda Nobunaga finally captures Nagashima fortress. 1575: Following a five-year war, the Ternateans under Sultan Babullah defeated the Portuguese. 1576: Tahmasp I, Safavid shah, dies. 1576: The Battle of Haldighati is fought between the ruler of Mewar, Maharana Pratap and the Mughal Empire's forces under Emperor Akbar led by Raja Man Singh. 1576: Sack of Antwerp by badly paid Spanish soldiers. 1577–1580: Francis Drake circles the world. 1577: Ki Ageng Pemanahan built his palace in Pasargede or Kotagede. 1578: King Sebastian of Portugal is killed at the Battle of Alcazarquivir. 1578: The Portuguese establish a fort on Tidore but the main centre for Portuguese activities in Maluku becomes Ambon.[12] 1578: Sonam Gyatso is conferred the title of Dalai Lama by Tumed Mongol ruler, Altan Khan. Recognised as the reincarnation of two previous Lamas, Sonam Gyatso becomes the third Dalai Lama in the lineage.[15] 1578: Governor-General Francisco de Sande officially declared war against Brunei in 1578, starting the Castilian War of 1578. 1579: The Union of Utrecht unifies the northern Netherlands, a foundation for the later Dutch Republic. 1579: The Union of Arras unifies the southern Netherlands, a foundation for the later states of the Spanish Netherlands, the Austrian Netherlands and Belgium.The Irish Gaelic chieftain's feast, from The Image of Ireland 1579: The British navigator Sir Francis Drake passes through Maluku and transit in Ternate on his circumnavigation of the world. The Portuguese establish a fort on Tidore but the main centre for Portuguese activities in Maluku becomes Ambon.[16] Main article: 1580s The fall of Spanish Armada 1580: Drake's royal reception after his attacks on Spanish possessions influences Philip II of Spain to build up the Spanish Armada. English ships in Spanish harbours are impounded. 1580: Spain unifies with Portugal under Philip II. The struggle for the throne of Portugal ends the Portuguese Empire. The Spanish and Portuguese crowns are united for 60 years, i.e. until 1640. 1580–1587: Nagasaki comes under control of the Jesuits. 1581: Dutch Act of Abjuration, declaring abjuring allegiance to Philip II of Spain. 1581: Bayinnaung dies at the age of 65. 1582: Oda Nobunaga commits seppuku during the Honnō-ji Incident coup by his general, Akechi Mitsuhide. 1582: Pope Gregory XIII issues the Gregorian calendar. The last day of the Julian calendar was Thursday, 4 October 1582 and this was followed by the first day of the Gregorian calendar, Friday, 15 October 1582 1582: Yermak Timofeyevich conquers the Siberia Khanate on behalf of the Stroganovs. 1583: Denmark builds the world's first theme park, Bakken. 1583: Death of Sultan Babullah of Ternate. 1584–1585: After the siege of Antwerp, many of its merchants flee to Amsterdam. According to Luc-Normand Tellier, "At its peak, between 1510 and 1557, Antwerp concentrated about 40% of the world trade...It is estimated that the port of Antwerp was earning the Spanish crown seven times more revenues than the Americas."[17] 1584: Ki Ageng Pemanahan died. Sultan Pajang raised Sutawijaya, son of Ki Ageng Pemanahan as the new ruler in Mataram, titled "Loring Ngabehi Market" (because of his home in the north of the market). 1585: Akbar annexes Kashmir and adds it to the Kabul SubahPortuguese fusta in India from a book by Jan Huygen van Linschoten 1585: Colony at Roanoke founded in North America. 1585–1604: The Anglo-Spanish War is fought on both sides of the Atlantic. 1587: Mary, Queen of Scots is executed by Elizabeth I. 1587: The reign of Abbas I marks the zenith of the Safavid dynasty. 1587: Troops that would invade Pajang Mataram Sultanate storm ravaged the eruption of Mount Merapi. Sutawijaya and his men survived. 1588: Mataram into the kingdom with Sutawijaya as Sultan, titled "Senapati Ingalaga Sayidin Panatagama" means the warlord and cleric Manager Religious Life. 1588: England repulses the Spanish Armada. 1589: Spain repulses the English Armada. 1589: Catherine de' Medici dies at aged 69. Main articles: 1590s and 1600s Abu'l-Fazl ibn Mubarak presenting Akbarnama to Mughal Azam Akbar, Mughal miniature 1590: Siege of Odawara: the Go-Hojo clan surrender to Toyotomi Hideyoshi, and Japan is unified. 1591: Gazi Giray leads a huge Tatar expedition against Moscow. 1591: In Mali, Moroccan forces of the Sultan Ahmad al-Mansur led by Judar Pasha defeat the Songhai Empire at the Battle of Tondibi. 1592–1593: John Stow reports 10,675 plague deaths in London, a city of approximately 200,000 people. 1592–1598: Korea, with the help of Ming dynasty China, repels two Japanese invasions. 1593–1606: The Long War between the Habsburg monarchy and the Ottoman Turks. 1594: St. Paul's College, Macau, founded by Alessandro Valignano. 1595: First Dutch expedition to Indonesia sets sail for the East Indies with two hundred and forty-nine men and sixty-four cannons led by Cornelis de Houtman.[18] 1596: Birth of René Descartes. 1596: June, de Houtman's expedition reaches Banten the main pepper port of West Java where they clash with both the Portuguese and Indonesians. It then sails east along the north coast of Java losing twelve crew to a Javanese attack at Sidayu and killing a local ruler in Madura.[18] 1597: Romeo and Juliet is published. 1597: Cornelis de Houtman's expedition returns to the Netherlands with enough spices to make a considerable profit.[18] 1598: The Edict of Nantes ends the French Wars of Religion. 1598: Abbas I moves Safavids capital from Qazvin to Isfahan in 1598. 1598–1613: Russia descends into anarchy during the Time of Troubles. 1598: The Portuguese require an armada of 90 ships to put down a Solorese uprising.[12] (to 1599) 1598: More Dutch fleets leave for Indonesia and most are profitable.[18]Edo period screen depicting the Battle of Sekigahara 1598: The province of Santa Fe de Nuevo México is established in Northern New Spain. The region would later become a territory of Mexico, the New Mexico Territory in the United States, and the US State of New Mexico. 1598: Death of Toyotomi Hideyoshi, known as the unifier of Japan. 1599: The Mali Empire is defeated at the Battle of Jenné. 1599: The van Neck expedition returns to Europe. The expedition makes a 400 per cent profit.[18] (to 1600) 1599: March, Leaving Europe the previous year, a fleet of eight ships under Jacob van Neck was the first Dutch fleet to reach the 'Spice Islands' of Maluku.[18] 1600: Giordano Bruno is burned at the stake for heresy in Rome.Siege of Fiľakovo castle during the Long Turkish War 1600: Battle of Sekigahara in Japan. End of the Warring States period and beginning of the Edo period. 1600: The Portuguese win a major naval battle in the bay of Ambon.[19] Later in the year, the Dutch join forces with the local Hituese in an anti-Portuguese alliance, in return for which the Dutch would have the sole right to purchase spices from Hitu.[19] 1600: Elizabeth I grants a charter to the British East India Company beginning the English advance in Asia. 1600: Michael the Brave unifies the three principalities: Wallachia, Moldavia and Transylvania after the Battle of Şelimbăr from 1599. For later events, see Timeline of the 17th century. Polybius' The Histories translated into Italian, English, German and French.[20] Mississippian culture disappears. Medallion rug, variant Star Ushak style, Anatolia (modern Turkey), is made. It is now kept at the Saint Louis Art Museum. Hernan Cortes (1485–1547) Henry VIII, (1491–1547) King of England and Ireland Don Fernando Álvarez de Toledo (1507–1582) Suleiman the Magnificent, Sultan of the Ottoman Empire (1520–1566) Ivan IV the Terrible (1530–1584) Oda Nobunaga (1534–1582) Sir Francis Drake (c. 1540 – 1596) Alberico Gentili, (1552–1608) the Father of international law Philip II of Spain, King of Spain (1556–1598) Akbar the Great, Mughal emperor (1556–1605) Related article: List of 16th century inventions. The Columbian Exchange introduces many plants, animals and diseases to the Old and New Worlds. Introduction of the spinning wheel revolutionizes textile production in Europe. The letter J is introduced into the English alphabet. 1500: First portable watch is created by Peter Henlein of Germany.The Iberian Union in 1598, under Philip II, King of Spain and Portugal 1513: Juan Ponce de León sights Florida and Vasco Núñez de Balboa sights the eastern edge of the Pacific Ocean. 1519–1522: Ferdinand Magellan and Juan Sebastián Elcano lead the first circumnavigation of the world. 1519–1540: In America, Hernando de Soto expeditions map the Gulf of Mexico coastline and bays. 1525: Modern square root symbol (√) 1540: Francisco Vásquez de Coronado sights the Grand Canyon. 1541–42: Francisco de Orellana sails the length of the Amazon River. 1542–43: Firearms are introduced into Japan by the Portuguese. 1543: Copernicus publishes his theory that the Earth and the other planets revolve around the Sun 1545: Theory of complex numbers is first developed by Gerolamo Cardano of Italy. 1558: Camera obscura is first used in Europe by Giambattista della Porta of Italy. 1559–1562: Spanish settlements in Alabama/Florida and Georgia confirm dangers of hurricanes and local native warring tribes. 1565: Spanish settlers outside New Spain (Mexico) colonize Florida's coastline at St. Augustine. 1565: Invention of the graphite pencil (in a wooden holder) by Conrad Gesner. Modernized in 1812. 1568: Gerardus Mercator creates the first Mercator projection map. 1572: Supernova SN 1572 is observed by Tycho Brahe in the Milky Way. 1582: Gregorian calendar is introduced in Europe by Pope Gregory XIII and adopted by Catholic countries. c. 1583: Galileo Galilei of Pisa, Italy identifies the constant swing of a pendulum, leading to development of reliable timekeepers. 1585: earliest known reference to the 'sailing carriage' in China. 1589: William Lee invents the stocking frame. 1591: First flush toilet is introduced by Sir John Harrington of England, the design published under the title 'The Metamorphosis of Ajax'. 1593: Galileo Galilei invents a thermometer. 1596: William Barents discovers Spitsbergen. 1597: Opera in Florence by Jacopo Peri. Entertainment in the 16th century ^ a b Modern reference works on the period tend to follow the introduction of the Gregorian calendar for the sake of clarity; thus NASA's lunar eclipse catalogue states "The Gregorian calendar is used for all dates from 1582 Oct 15 onwards. Before that date, the Julian calendar is used." For dates after 15 October 1582, care must be taken to avoid confusion of the two styles. ^ de Vries, Jan (14 September 2009). "The limits of globalization in the early modern world". The Economic History Review. 63 (3): 710–733. CiteSeerX 10.1.1.186.2862. doi:10.1111/j.1468-0289.2009.00497.x. JSTOR 40929823. S2CID 219969360. SSRN 1635517. ^ Singh, Sarina; Lindsay Brown; Paul Clammer; Rodney Cocks; John Mock (2008). Pakistan & the Karakoram Highway. Vol. 7, illustrated. Lonely Planet. p. 137. ISBN 978-1-74104-542-0. Retrieved 23 August 2010. ^ Babur (2006). Babur Nama. Penguin Books. p. vii. 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An Encyclopedia of World History (5th ed. 1973); highly detailed outline of events online free Media related to 16th century at Wikimedia Commons Timelines of 16th century events, science, culture and persons Retrieved from " 4 The following pages link to 16th century External tools (link count transclusion count sorted list) · See help page for transcluding these entries Showing 50 items. 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