Hands-On Lab: Generative AI for Data Visualization

Estimated time needed: 60 minutes

Overview

In this lab, you will learn how to use generative AI to generate various visuals from the data set. You will use the https://www.einblick.ai/ platform to create multiple charts and graphs automatically using simple steps.

Learning objectives

After completing this lab, you will be able to:

- Sign in on https://www.einblick.ai/
- Generate visuals
- Change the color theme in the chart
- Generate Python code on Einblick for developing charts

Prerequisites

- Einblick account
- Basic understanding of exploratory data analysis (EDA)

About Einblick

With Einblick's ChartGen AI feature, you can create charts using descriptions written in natural language. This facilitates and increases accessibility to data visualization.

With the help of this natural language interface, users can ask questions about their data and get text summaries, code, or charts as responses. Using generative AI models, Einblick Prompt interprets user intent and provides a suitable response.

Data set

In this lab, you will work on the Student Alcohol Consumption data set "`student-mat.csv`" by UCI Machine Learning, which can be obtained at Kaggle. It is based on data collected from two secondary schools in Portugal. The students included in the survey were in mathematics and Portuguese courses.

The data set we are using is for the mathematics course. The number of mathematics students involved in the collection was 395. The data collected in locations such as Gabriel Pereira and Mousinho da Silveira includes several pertinence values. Examples of such data are records of demographic information, grades, and alcohol consumption.

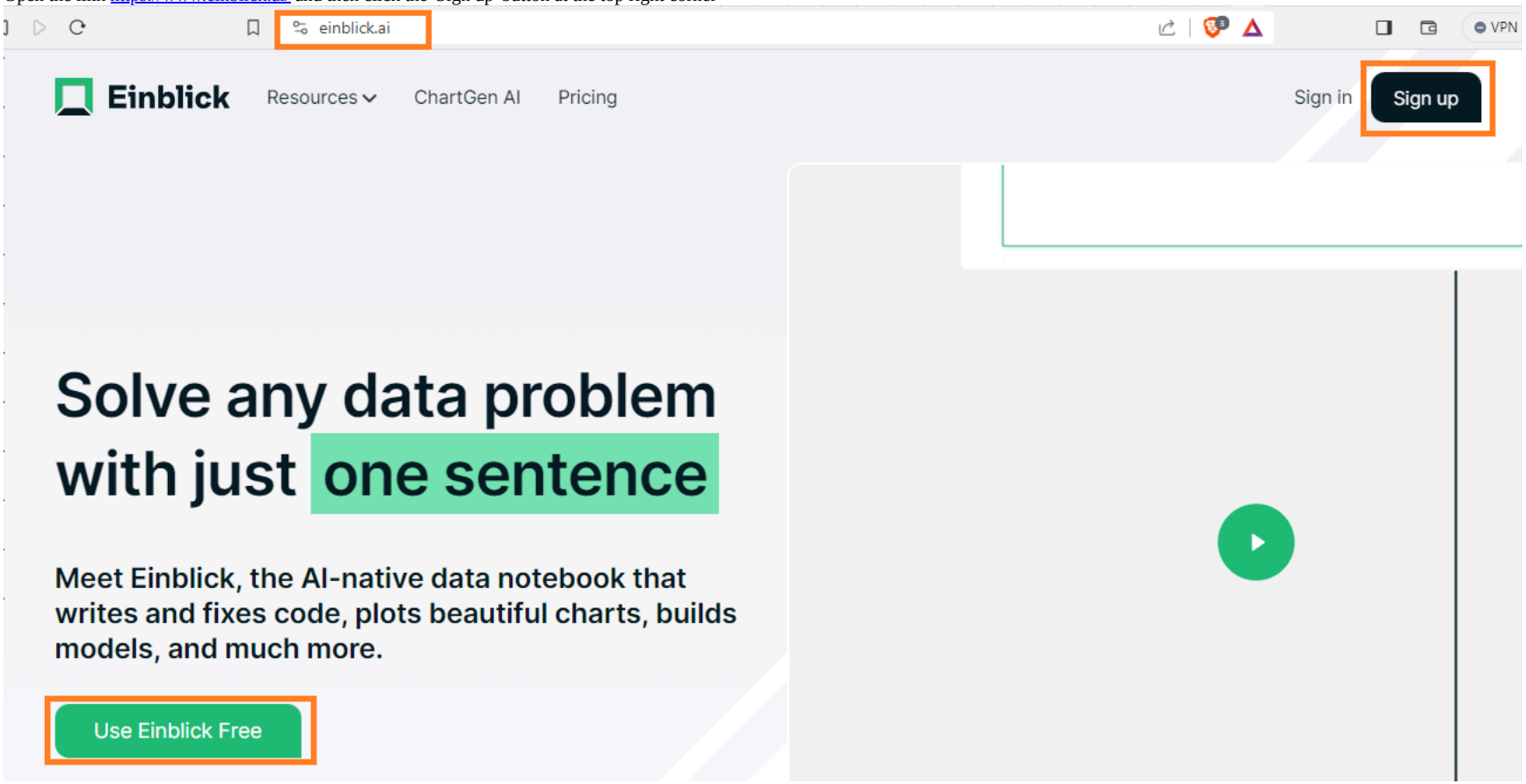
Field	Description
school	GP/MS for the student's school
sex	M/F for gender
age	15-22 for the student's age
address	U/R for urban or rural, respectively
fam size	LE3/GT3 for less than or greater than three family members
Pstatus	T/A for living together or apart from parents, respectively
Medu	0 (none) / 1 (primary-4th grade) / 2 (5th - 9th grade) / 3 (secondary) / 4 (higher) for mother's education
Fedu	0 (none) / 1 (primary-4th grade) / 2 (5th - 9th grade) / 3 (secondary) / 4 (higher) for father's education
Mjob	'teacher,' 'health' care related, civil 'services,' 'at_home' or 'other' for the student's mother's job
Fjob	'teacher,' 'health' care related, civil 'services,' 'at_home' or 'other' for the student's father's job
reason	close to 'home,' school 'reputation,' 'course' preference, or 'other' for the choice of school
guardian	mother/father/other as the student's guardian
traveltime	1 (<15mins) / 2 (15 - 30 mins) / 3 (30 mins - 1 hr) / 4 (>1hr) for a time from home to school
studytime	1 (<2hrs) / 2 (2 - 5hrs) / 3 (5 - 10hrs) / 4 (>10hrs) for weekly study time

Field	Description
failures	1-3/4 for the number of class failures (if more than three, then record 4)
schoolsup	yes/no for extra educational support
famsup	yes/no for family educational support
paid	yes/no for extra paid classes for Math or Portuguese
activities	yes/no for extra-curricular activities
nursery	yes/no for whether attended nursery school
higher	yes/no for the desire to continue studies
internet	yes/no for internet access at home
romantic	yes/no for relationship status
famrel	1-5 scale on quality of family relationships
freetime	1-5 scale on how much free time after school
goout	1-5 scale on how much student goes out with friends
Dalc	1-5 scale on how much alcohol consumed on weekdays
Walc	1-5 scale on how much alcohol consumed on the weekend
health	1-5 scale on health condition
absences	0-93 number of absences from school
G1	0-20 for the first-period grade
G2	0-20 for the second-period grade
G3	0-20 for the final grade

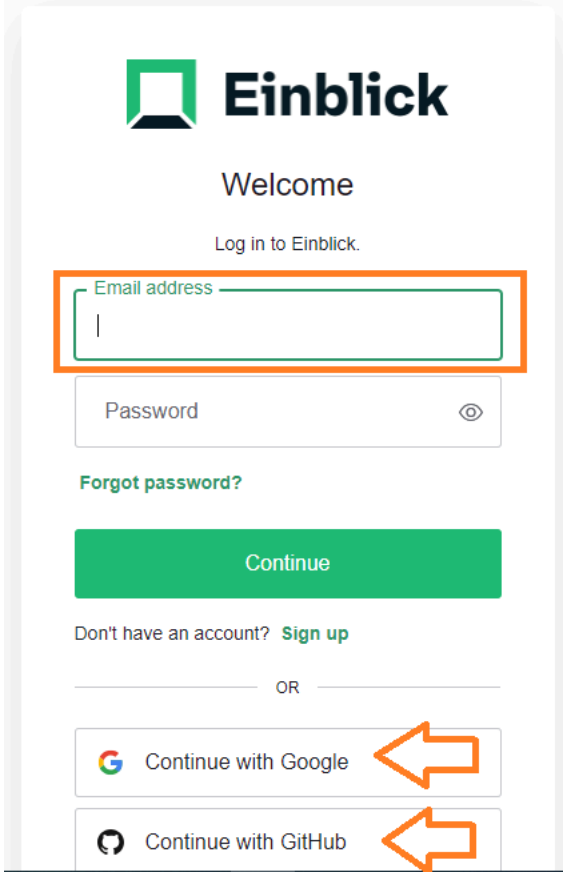
Task 1: Signing up and creating the account

1. Sign up for Einblick.

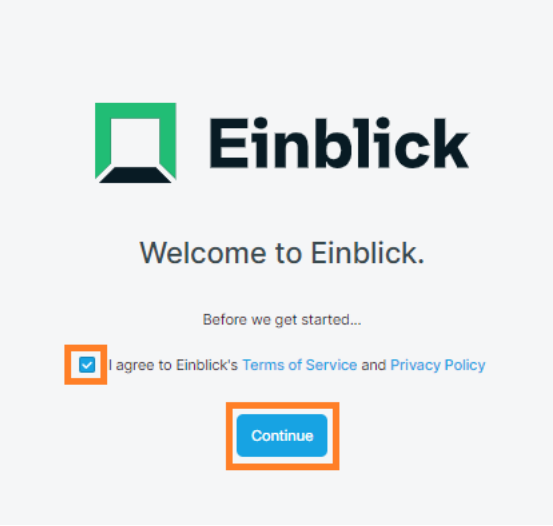
2. Open the link https://www.einblick.ai/ and then click the 'Sign up' button at the top right corner



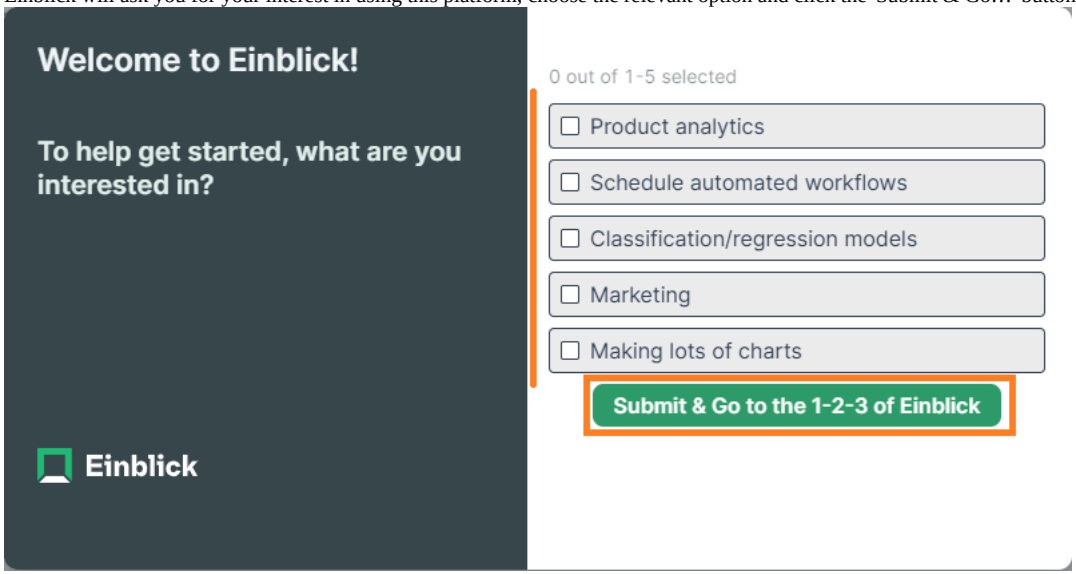
3. You will see the 'Welcome' pop-up window. You may continue with an existing Google or GitHub account or create a new one by clicking sign up under the continue button.



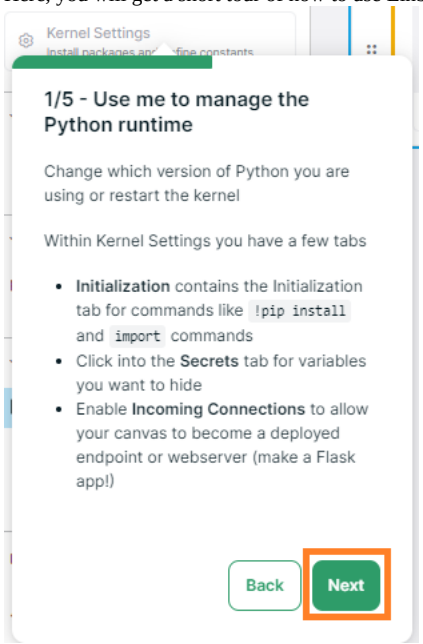
4. After creating your account, you may sign in and see the following welcome screen. Click the 'Continue' button.



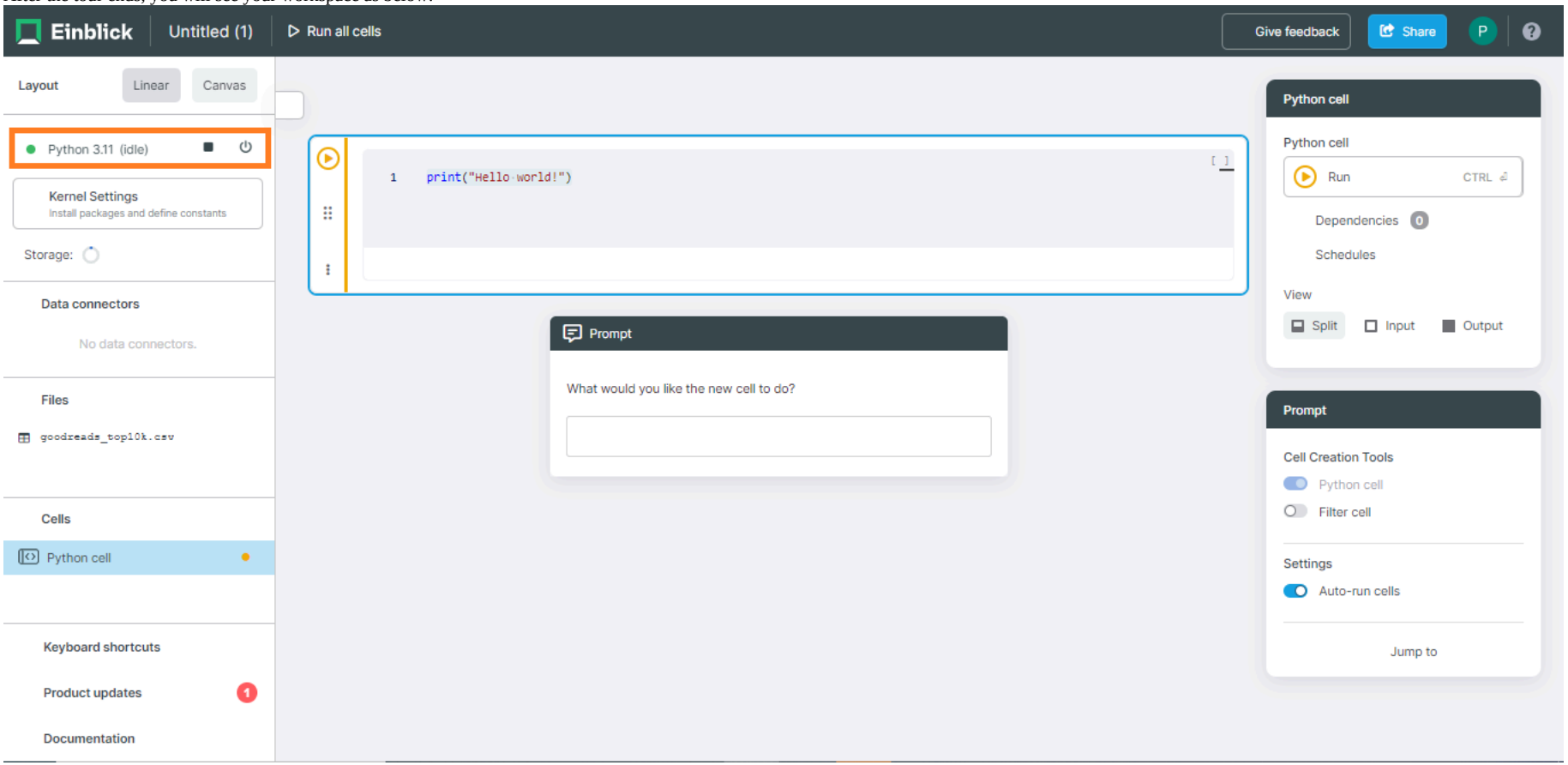
5. Einblick will ask you for your interest in using this platform; choose the relevant option and click the 'Submit & Go…' button.



6. Here, you will get a short tour of how to use Einblick. Follow along the steps by pressing the 'Next' button.



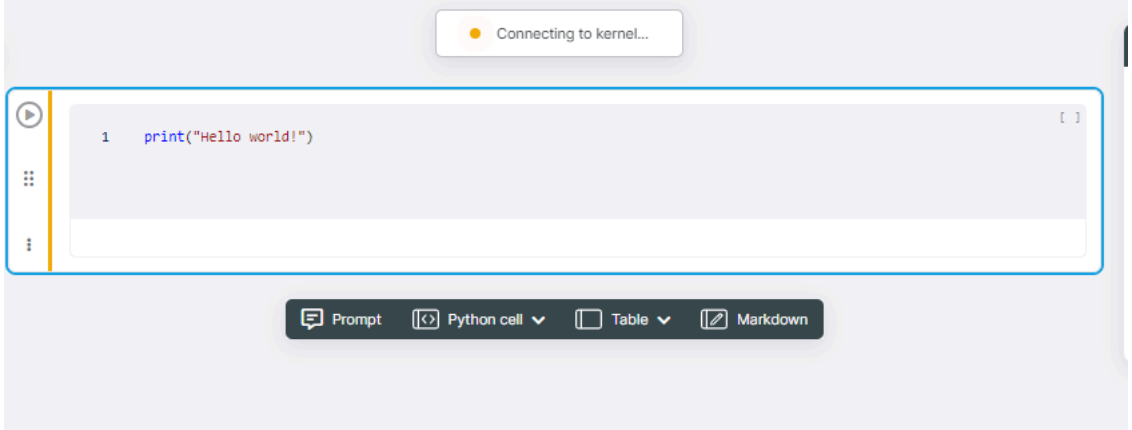
7. After the tour ends, you will see your workspace as below:



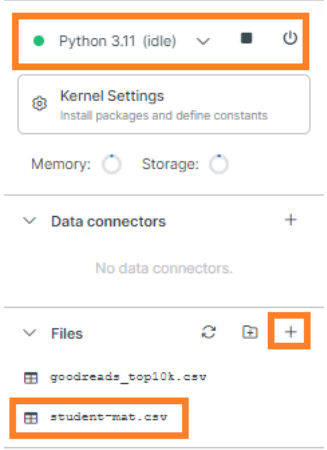
Try to switch between different layouts, linear and canvas, and see how the appearance of your workspace changes on Einblick.

Task 2: Connecting to the data set

You might have to wait for a while till the kernel gets connected.

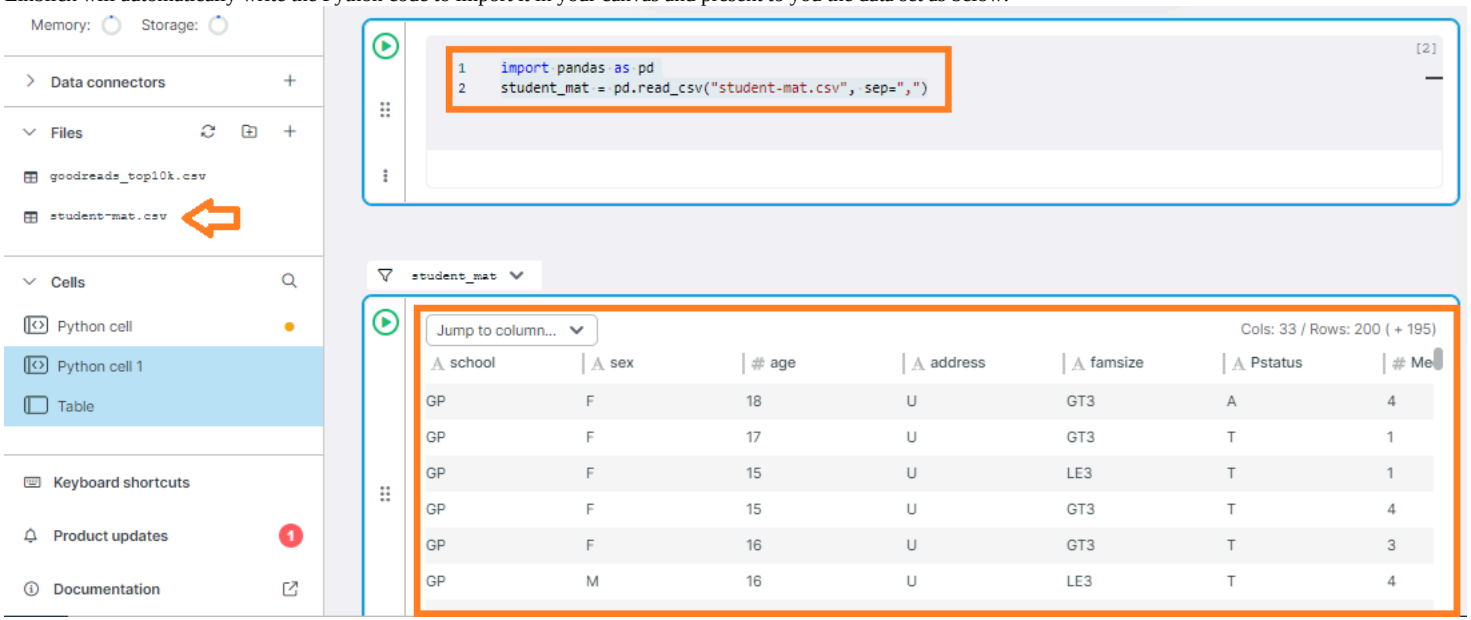


First, you will upload the data set in your case student-mat.csv file. To do so, click the drop-down arrow of 'Files' on the left-hand panel, click the '+' sign, and upload the data set from where you stored it earlier.



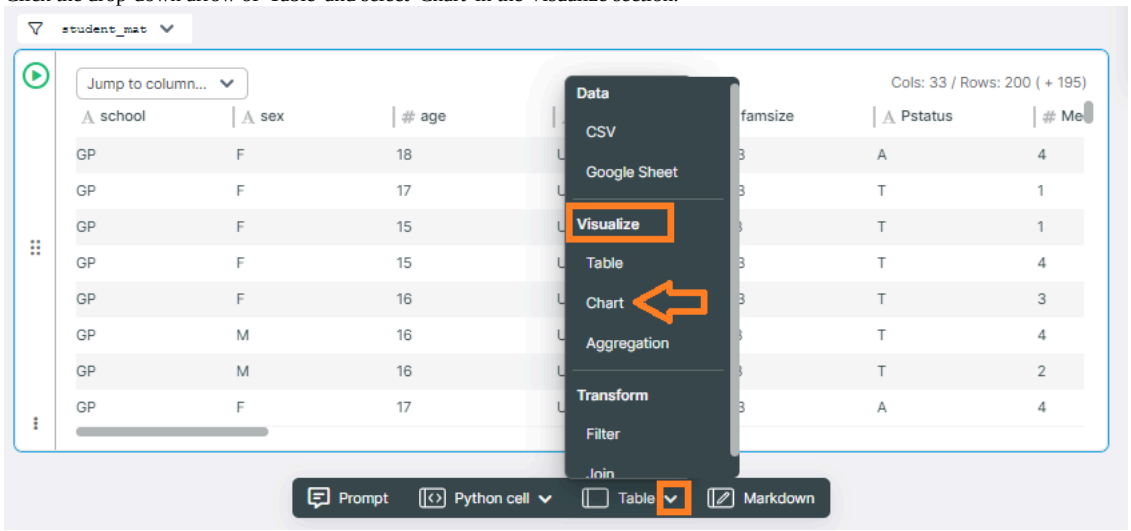
Once the data set is uploaded, double-click the Files menu.

Einblick will automatically write the Python code to import it in your canvas and present to you the data set as below:

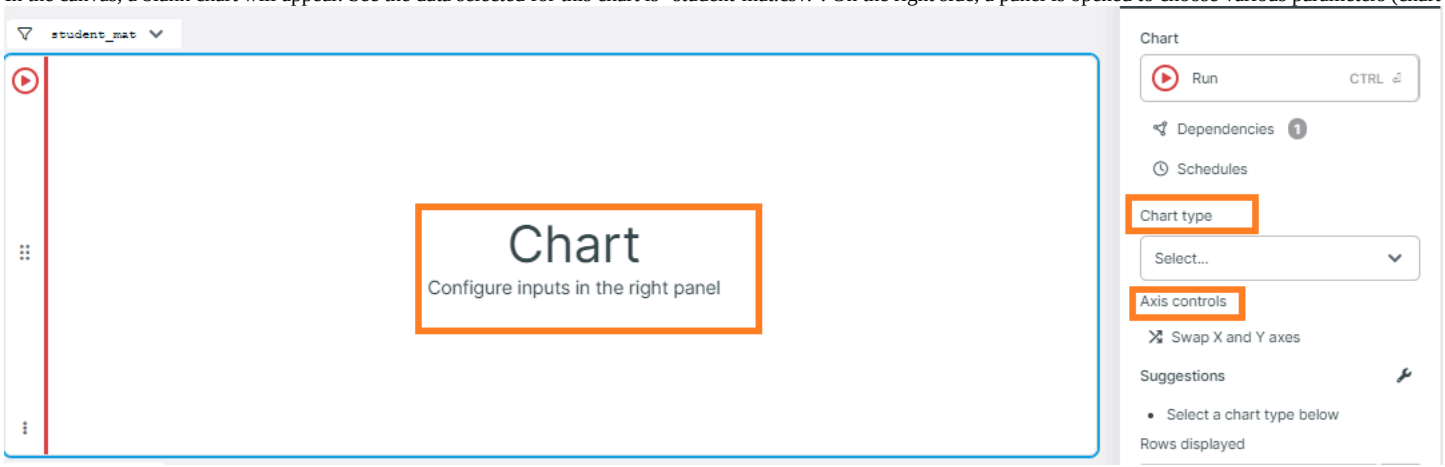


Task 3: Generating a first visual on the data set to know the total number of male and female students in the data set

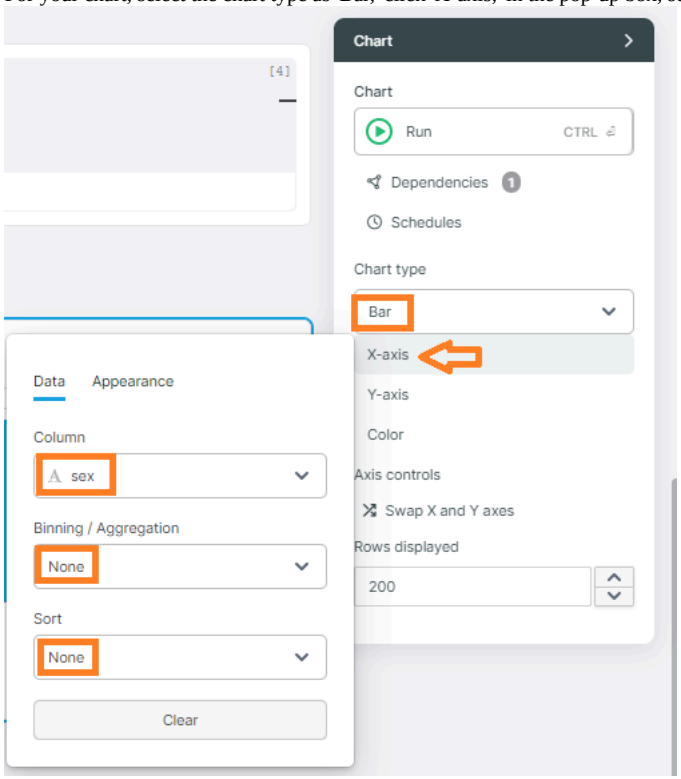
Click the drop-down arrow of 'Table' and select 'Chart' in the Visualize section.



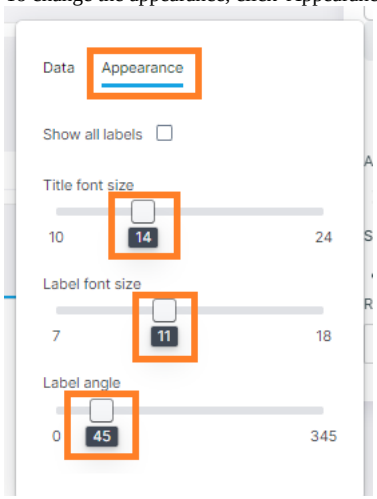
In the canvas, a blank chart will appear. See the data selected for this chart is "student-mat.csv.". On the right side, a panel is opened to choose various parameters (chart type, axis control, etc.) for this chart.



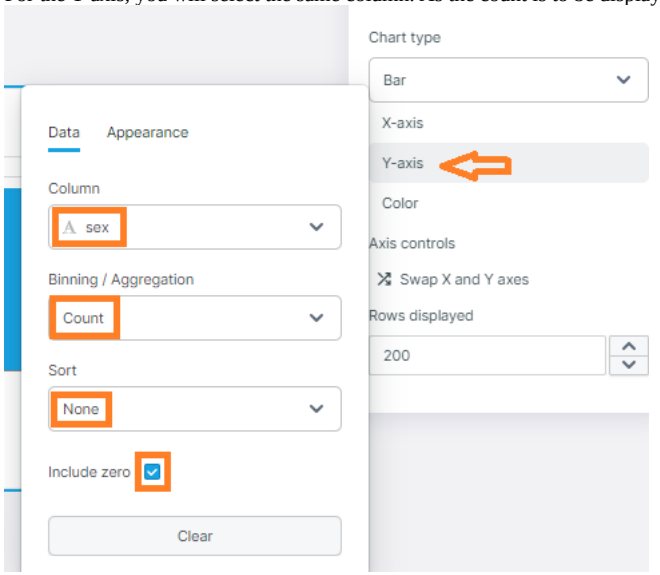
For your chart, select the chart type as 'Bar,' click 'X-axis,' in the pop-up box, select the Column as 'sex,' and in 'Binning / Aggregation, select 'None.' The same is true for 'Sort' under 'Data', as shown below:



To change the appearance, click 'Appearance'and then select the appropriate font size and angle as shown below:

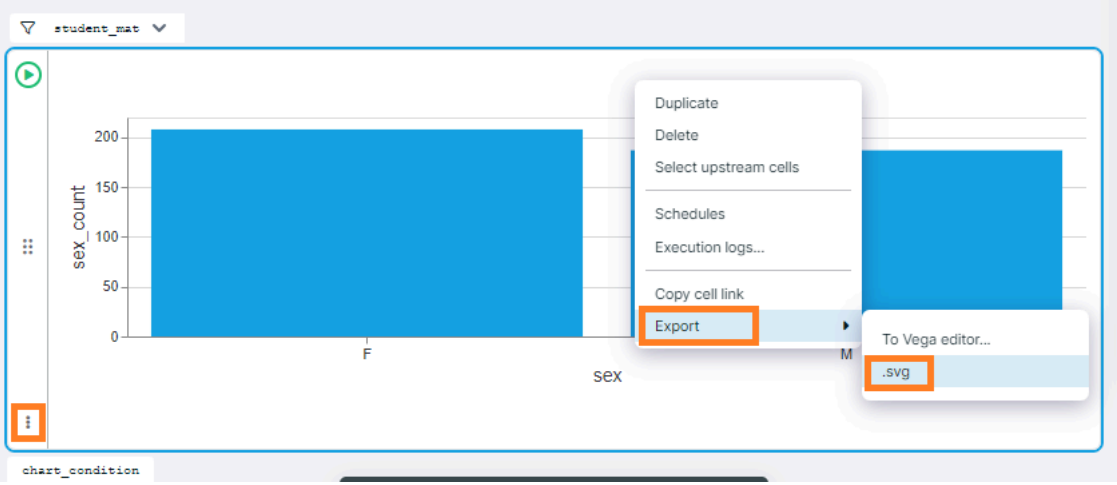


For the Y-axis, you will select the same column. As the count is to be displayed, you will select 'Count' in the 'Binning / Aggregation'. Check on the box to include zeros while displaying the values.



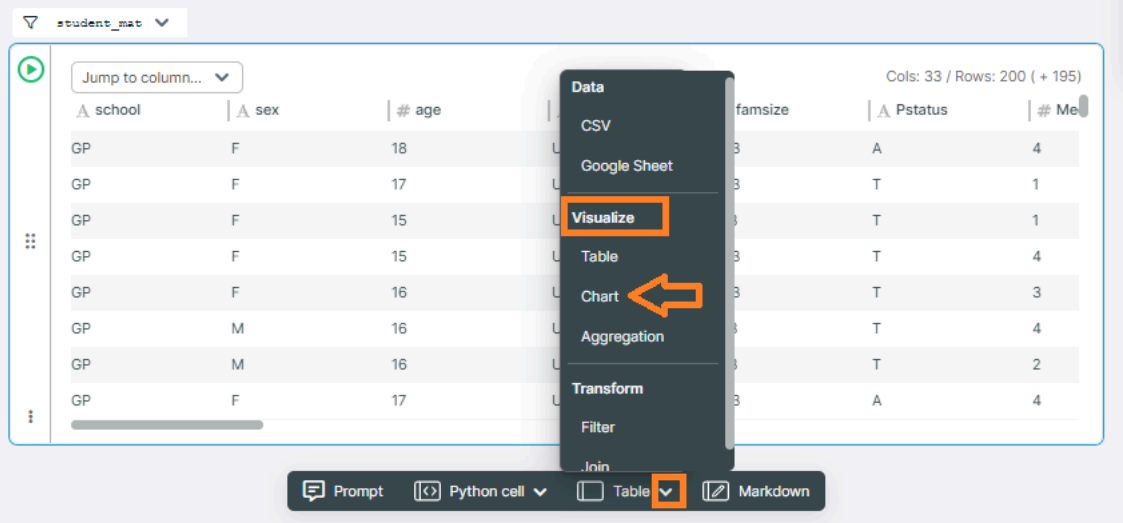
The generated chart will look like this:

Export the chart and save it. To do so, right-click the three dots on the chart (or anywhere on the chart), select 'Export,' select '.svg,' and save it on your machine.

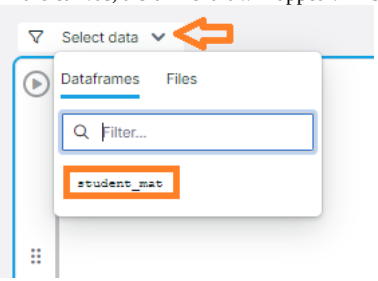


Task 4: Generating a pie chart for displaying the average value of weekend alcohol for each sex in the data set

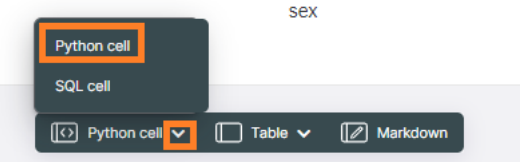
Click the drop-down arrow on 'Table', and then select 'Chart' in the Visualize section.



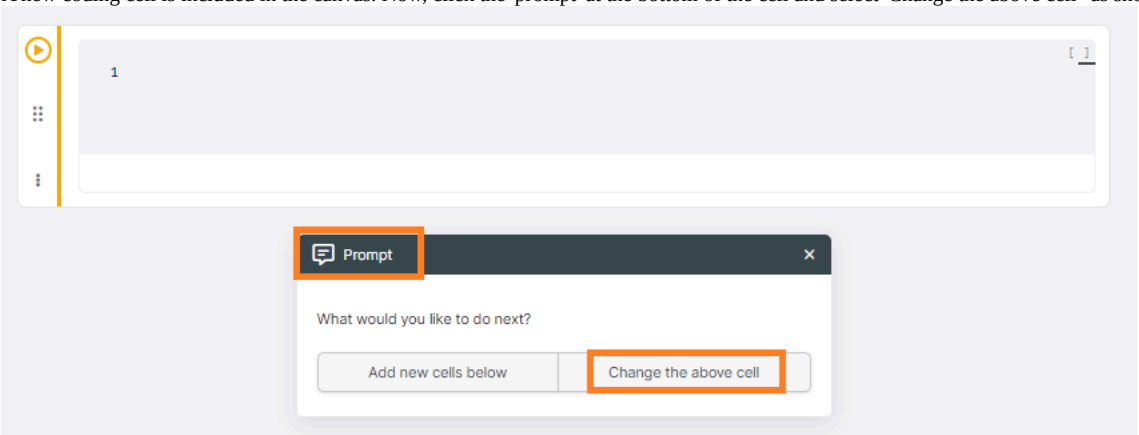
In the canvas, a blank chart will appear. If "student-mat.csv" is not selected for the chart, click the 'Select data' drop-down arrow and click 'student_mat.'



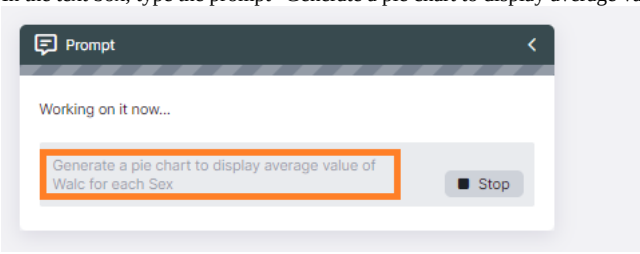
Now, you will add a new Python cell. To do so, click the "Python cell" drop-down on the menu bar and select "Python cell."



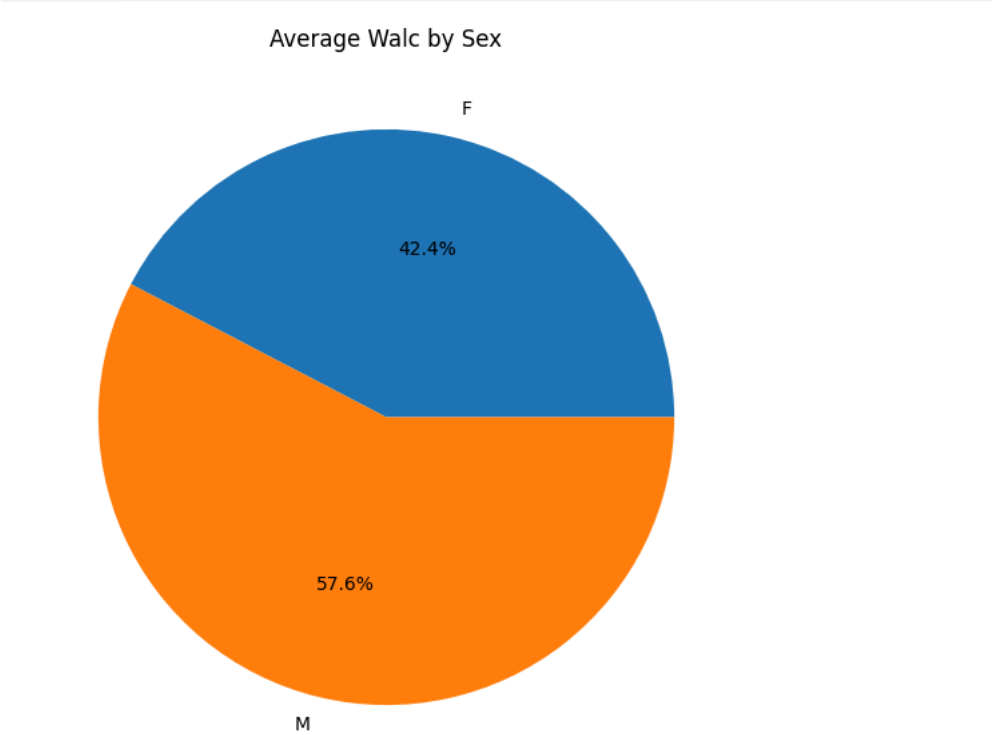
A new coding cell is included in the canvas. Now, click the 'prompt' at the bottom of the cell and select 'Change the above cell" as shown below:



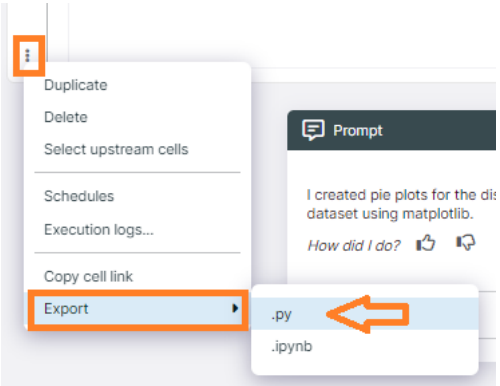
In the text box, type the prompt "Generate a pie chart to display average value of Walc for each Sex" and then press Enter.



Einblick will generate a Python code for creating this pie chart and will also display the chart as shown below:

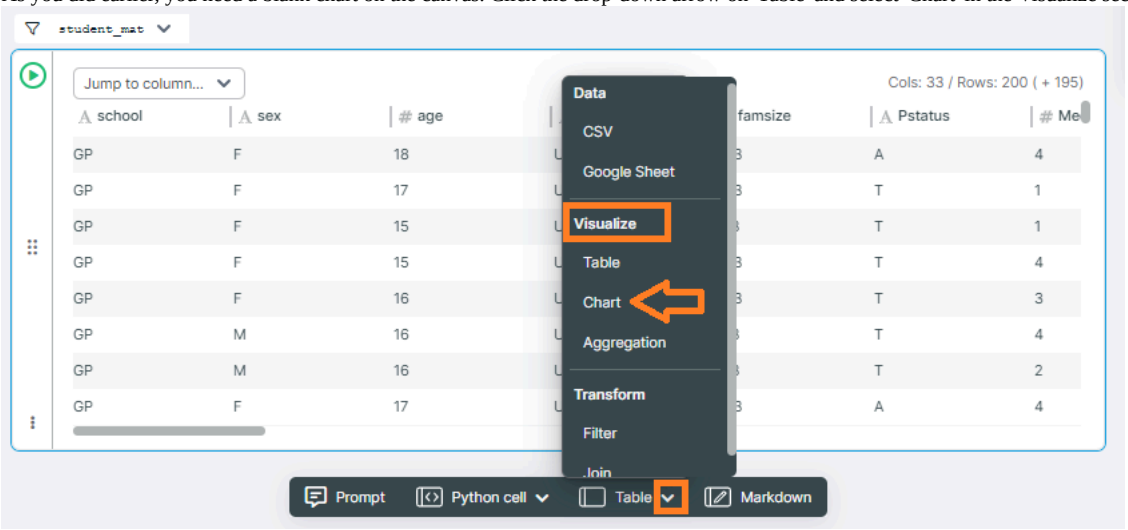


You can download this code file as .py or.ipynb. Click the three vertical dots, then select 'Export' and choose the Python extension you want to download the code.

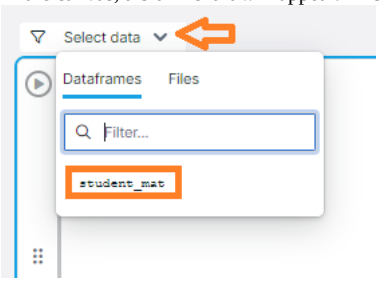


Task 5: Generating a chart with three attributes from the data set, 'Walc,' 'Dalc,' and 'famrel,' to know the effect of family relation on the drinking tendency of students (both on weekends and weekdays)

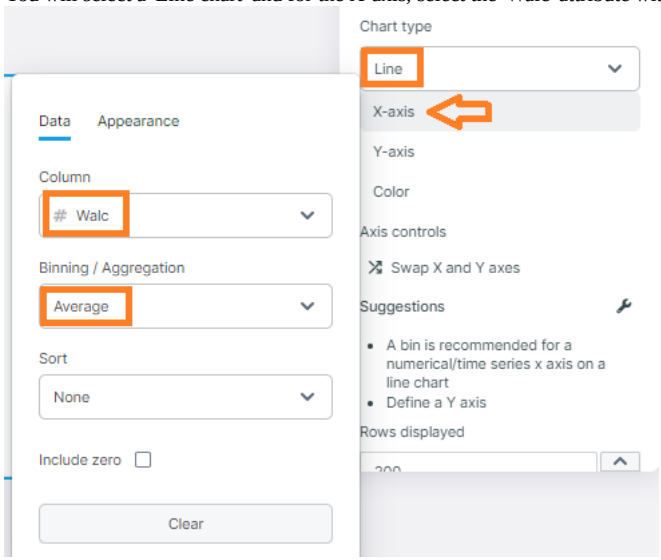
As you did earlier, you need a blank chart on the canvas. Click the drop-down arrow on 'Table' and select 'Chart' in the Visualize section.



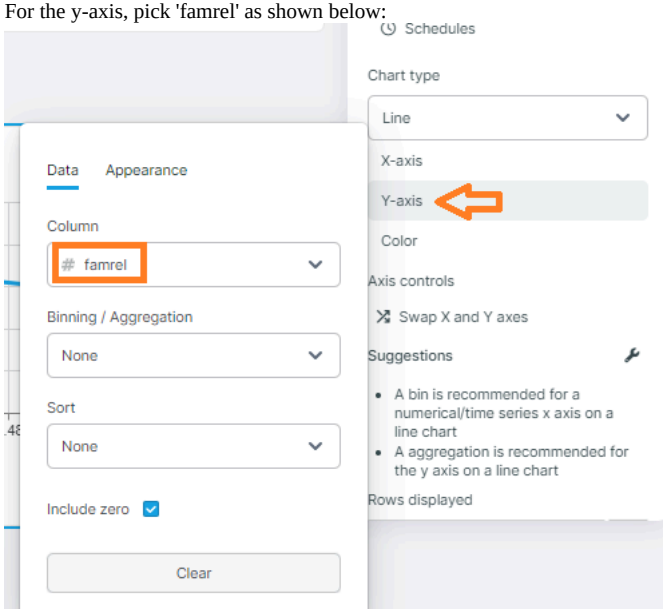
In the canvas, a blank chart will appear. If "student-mat.csv" is not selected for the chart, click the 'Select data' drop-down arrow and click 'student_mat.'



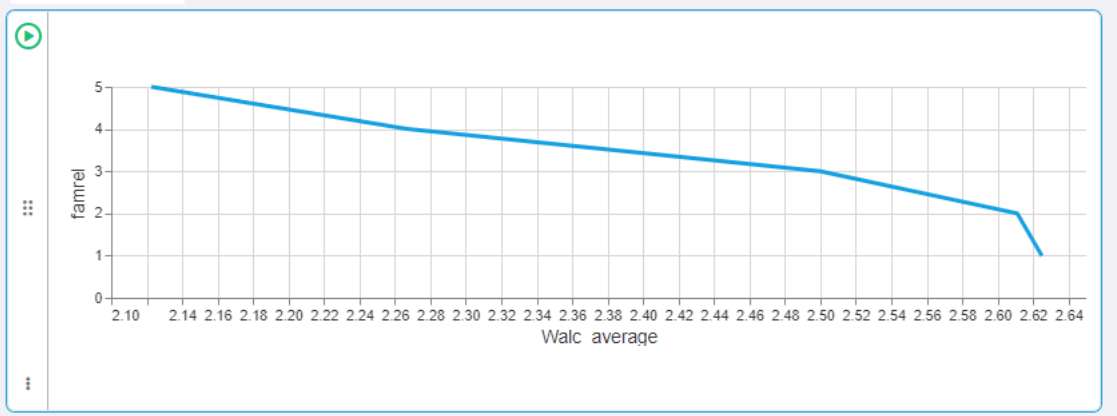
You will select a 'Line chart' and for the X-axis, select the 'Walc' attribute with 'Average' as 'Binning/Aggregation'.



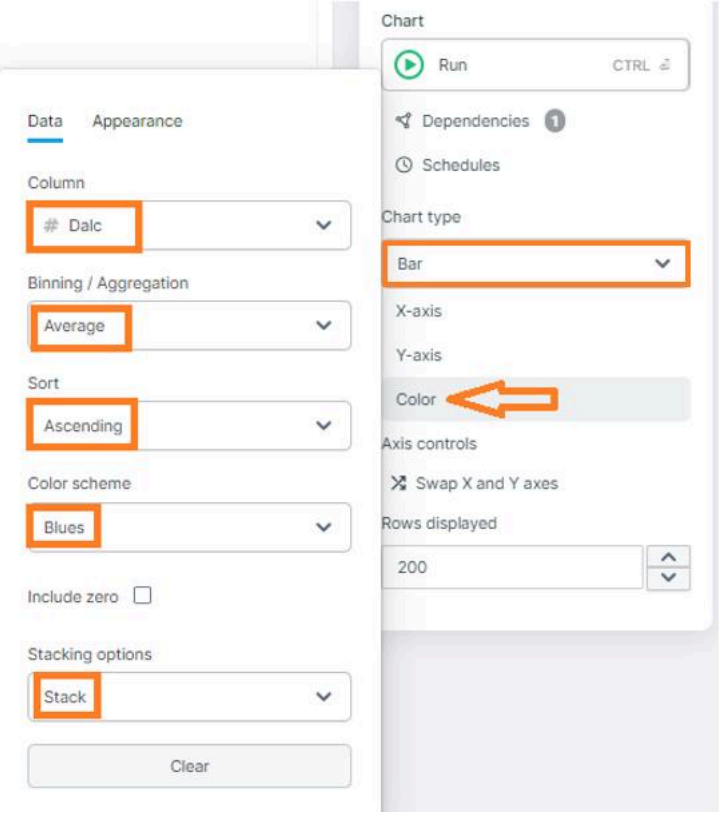
For the y-axis, pick 'famrel' as shown below:



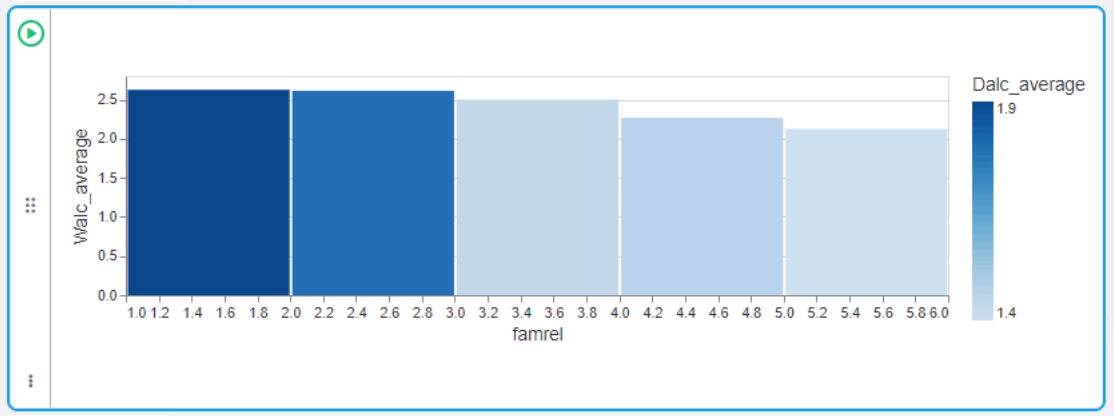
A line chart is generated as below:



You can switch to 'Bar chart' and use color to include the third attribute (Dalc). Choose the values below in the right-hand panel for 'Color.'

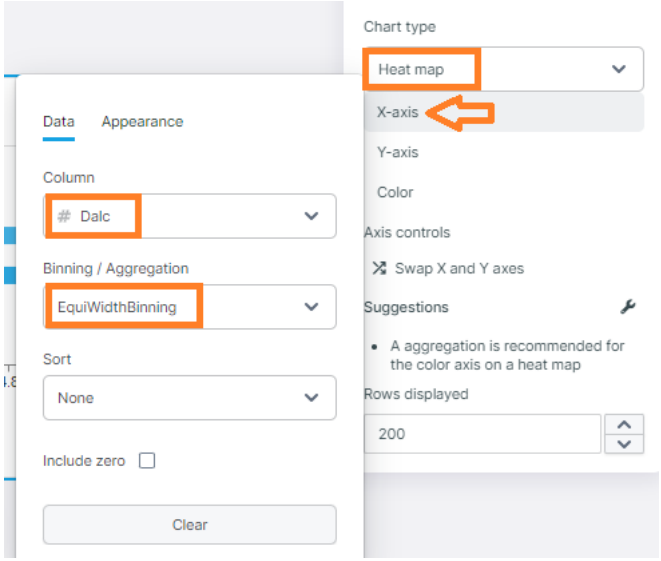


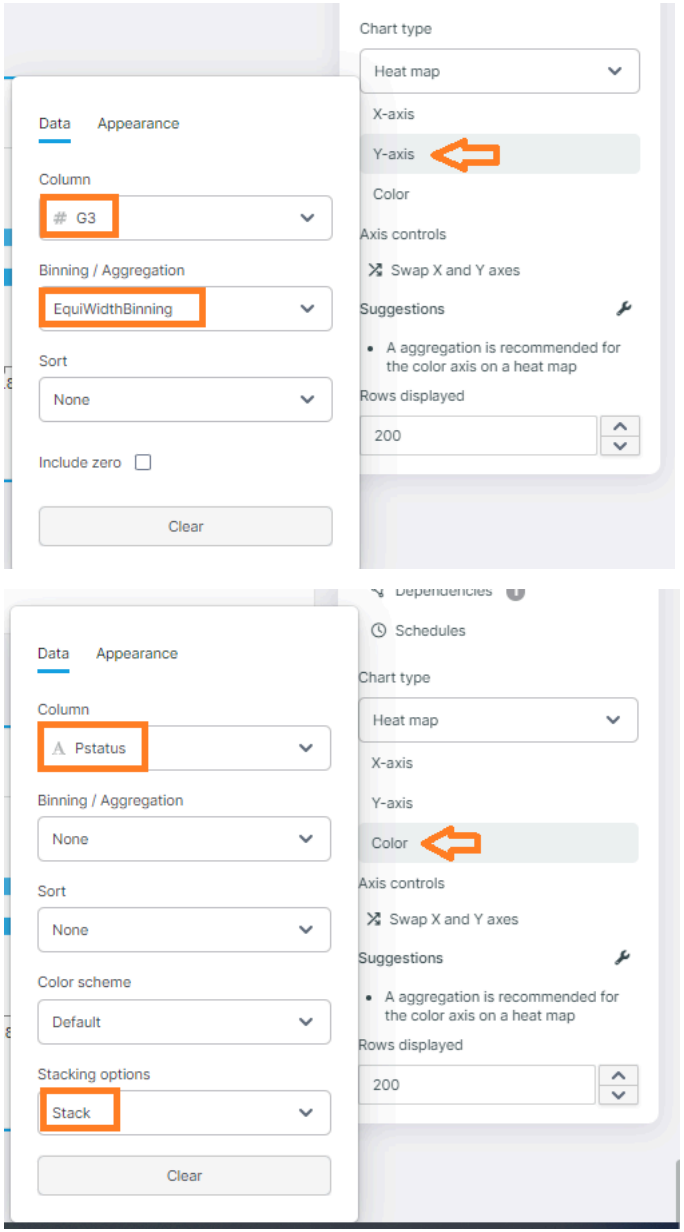
Now click "Swap X and Y axes" in the Axis control, and the chart is generated with the color legend for 'Dalc_average.'



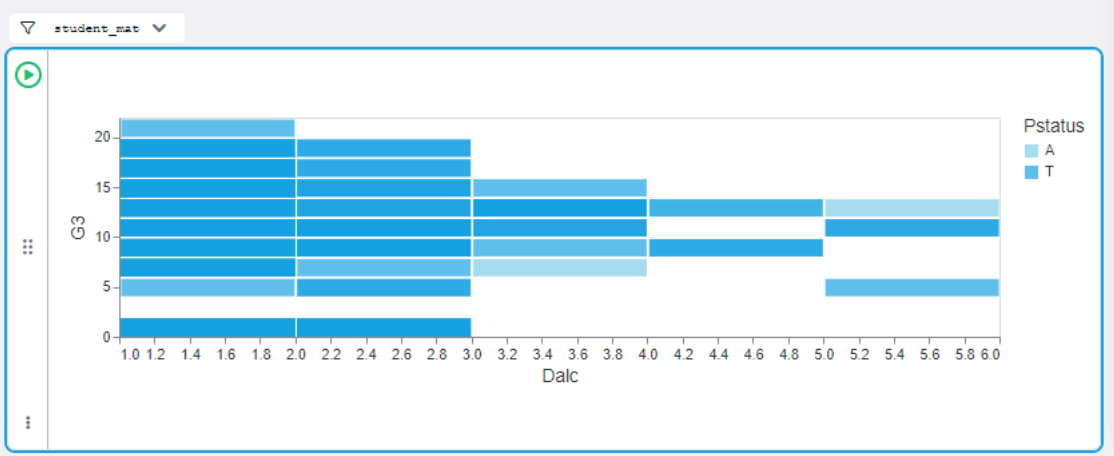
Task 6: Creating a heatmap to display the effect on grade (G3) of mean alcohol level consumption in workday alcohol consumption and Pstatus (parent status—single or together)

As you did earlier, you need a blank chart on the canvas. For this task, select 'Heatmap' as the heart type for the x-axis, select 'Dalc' with equiwidth binning, in the y-axis, select 'G3' with equiwidth binning, and for color, select 'Pstatus' as shown below:





The heatmap will be generated as below:



Conclusion

In this lab, you learned how to use generative AI to generate various charts and graphs on the given data set.

Author:

Dr. Pooja