AP Computer Science Principles
Ticket Out the Door
Set 0: Visualizing Data

Name _____ Period _____

Skill 0.1 Exercise 1
What is data?
How can data help you solve problems?

| **Skill 0.1 Exercise 2** |
|---|
| Take a look at the graph, A Fast-Food Problem: Where Have All the Teenagers Gone? |
| What does the data show? |
| Why might that be the case? |
| What questions do you have? |
| Take a look at the graph, https://www.nytimes.com/2017/09/19/learning/whats-going-on-in-this-graph-sept-19-2017.html |
| What does the data show? |
| Why might that be the case? |
| What questions do you have? |

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Skill 0.2 Exercise 1

Participants in a survey were asked how many hours per day they spend reading, how many hours per day they spend using a smartphone, and whether or not they would be interested in a smartphone application that lets users share book reviews.

The data from the survey are represented in the graph below. Each ✕ represents a survey participant who said he or she was interested in the application, and each ○ represents a participant who said he or she was not interested.
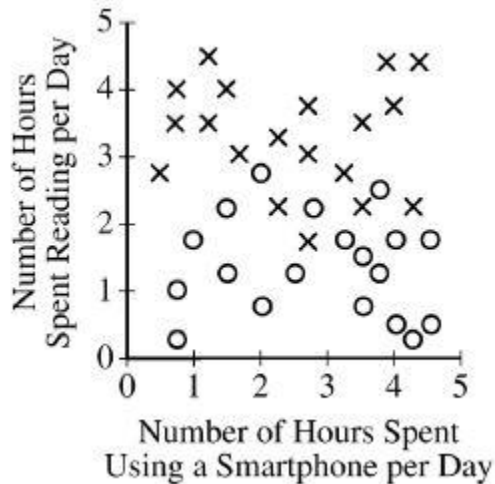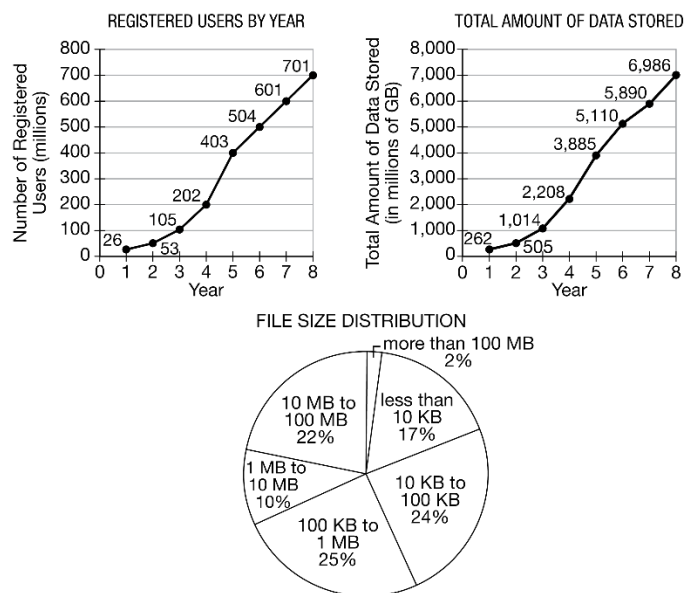

Which correlation is most consistent with the data in the graph?

A. Participants who read more were generally more likely to say they are interested in the application.

B. Participants who read more were generally less likely to say they are interested in the application.

C. Participants who use a smartphone more were generally more likely to say they read more.

D. Participants who use a smartphone more were generally less likely to say they read more.

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Skill 0.2 Exercise 2

A file storage application allows users to save their files on cloud servers. A group of researchers gathered user data for the first eight years of the application's existence. Some of the data are summarized in the following graphs. The line graph on the left shows the number of registered users each year. The line graph on the right shows the total amount of data stored by all users each year. The circle graph shows the distribution of file sizes currently stored by all users.

Which of the following correlations is most consistent with the information?

A. As the number of users increase, the size of the files stored increases

B. Over 75% of the files stored are 10 MB in size or less.

C. As the number of users increase, the amount of data stored per user increases

D. 75% of the files stored are at least 100 KB in size.

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Skill 0.2 Exercise 3

Biologists often attach tracking collars to wild animals. For each animal, the following geolocation data is collected at frequent intervals.
- The time
- The date
- The location of the animal

Identify whether each statement is correlation or causation.

Statement	Correlation/Causation
Wolves travel up to 30 miles per day	
Wolves and deer travel together	
Wolves can run up to 40 miles per hour	
Wolves typically travel at dawn and dusk	
Wolves typically travel during cooler weather	

Skill 0.2 Exercise 4

Each student at a school has a unique student ID number. A teacher has the following spreadsheets available.
- Spreadsheet I contains information on all students at the school. For each entry in this spreadsheet, the student name, the student ID, and the student's grade point average are included.
- Spreadsheet II contains information on only students who play at least one sport. For each entry in this spreadsheet, the student ID and the names of the sports the student plays are included.
- Spreadsheet III contains information on only students whose grade point average is greater than 3.5. For each entry in this spreadsheet, the student name and the student ID are included.
- Spreadsheet IV contains information on only students who play more than one sport. For each entry in this spreadsheet, the student name and the student ID are included.

The teacher wants to determine whether students who play a sport are more or less likely to have higher grade point averages than students who do not play any sports.

Which of the following pairs of spreadsheets can be combined and analyzed to determine the desired correlation?

A. Spreadsheets I and II

B. Spreadsheets I and IV

C. Spreadsheets II and III

D. Spreadsheets III and IV

After analyzing the data, the teacher draws the following conclusion: Students who play sports study more than students who do not. What is wrong with this statement?

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Skill 0.3 Exercise 1
A camera mounted on the dashboard of a car captures an image of the view from the driver's seat every second. Each image is stored as data. Along with each image, the camera also captures and stores the car's speed, the date and time, and the car's GPS location as metadata. Which of the following can best be determined using only the data and none of the metadata?
A. The average number of hours per day that the car is in use
B. The car's average speed on a particular day
C. The distance the car traveled on a particular day
D. The number of bicycles the car passed on a particular day

Skill 0.3 Exercise 2
A certain social media Web site allows users to post messages and to comment on other messages that have been posted. When a user posts a message, the message itself is considered data. In addition to the data, the site stores the following metadata.

- The time the message was posted
- The name of the user who posted the message
- The names of any users who comment on the message and the times the comments were made

For which of the following goals would it be more useful to analyze the data instead of the metadata?

A. To determine the users who post messages most frequently

B. To determine the time of day that the site is most active

C. To determine the topics that many users are posting about

D. To determine which posts from a particular user have received the greatest number of comments

Skill 0.3 Exercise 3
A digital photo file contains data representing the level of red, green, and blue for each pixel in the photo. The file also contains metadata that describes the date and geographic location where the photo was taken. For which of the following goals would analyzing the metadata be more appropriate than analyzing the data?
A. Determining the likelihood that the photo is a picture of the sky
B. Determining the likelihood that the photo was taken at a particular public event
C. Determining the number of people that appear in the photo
D. Determining the usability of the photo for projection onto a particular color background

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Skill 0.3 Exercise 4
Navigate to your browser and do an image search that depicts something you did this past summer.   • Click on the image   • Then, right-click on the image and select "copy image address"   • Navigate to https://www.metadata2go.com/view-metadata   • From the "choose file" drop down menu select "from url" and paste the image address you just copied (ctrl-v)   List 5 pieces of metadata about the image you selected