4.7.6 Get the Passing Percentages

You're almost done compiling the data for the district summary. Now it's time to get the percentage of students who passed math and reading, as well as the overall passing percentage.

To get the percentage of students who passed math and reading, we will write code to:

1. Determine the passing grade.
2. Get the number of students who passed math and reading in separate DataFrames.
3. Calculate the number of students who passed math and reading.
4. Calculate the percentage of students who passed math and reading.

To get the overall passing percentage, we will write code to:

1. Get the number of students who passed both math and reading in a DataFrame.
2. Calculate the number of students who passed both math and reading.

3. Calculate the percentage of students who passed both math and reading.

Determine the Passing Grade

For math and reading assessment tests in this school district, the passing score was 70. Therefore, we need to get all the math and reading scores that are greater than or equal to 70. To do this, in a new cell, assign a `passing_math` variable to the math_score column in `school_data_complete_df`, where all the math scores are equal to or greater than 70.

```
passing_math = school_data_complete_df["math_score"] >= 70
passing_reading = school_data_complete_df["reading_score"] >= 70
```

To find the `passing_math` variable, run `passing_math` in a new cell. The result is Boolean values for the rows, where "True" means the score is equal to or greater than 70, and "False" means the score is not equal to or greater than 70.

```
passing_math = school_data_complete_df["math_score"] >= 70
passing_math
```

```
0          True
1         False
2         False
3         False
4          True
5          True
6          True
```

When we execute the code for `passing_reading`, we will get Boolean values for each row, where "True" means the score is equal to or greater than 70, and "False" means the score is not equal to or greater than 70.

Get the Number of Students Who Passed Math and Reading

To get all the students who passed math and all the students who passed reading, we need to filter our `school_data_complete_df` DataFrame for the "True" cases. In other words, get only the students who have a grade is equal or greater to 70.

We can filter the `school_data_complete_df` DataFrame by adding the `school_data_complete_df["math_score"] >= 70` within brackets, like this:

```
# Get all the students who are passing math in a new DataFrame.
passing_math = school_data_complete_df[school_data_complete_df["math_score"]
passing_math.head()
```

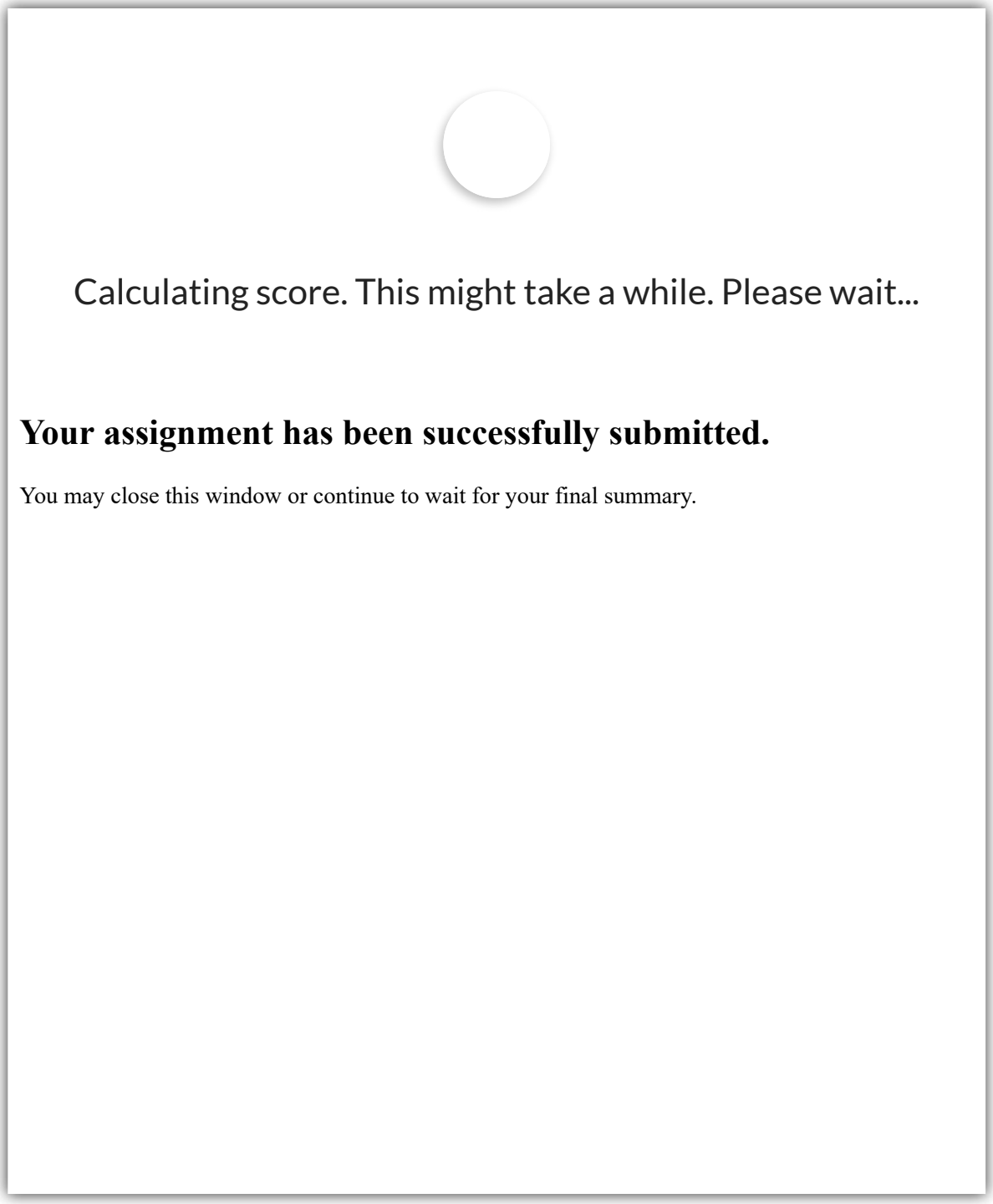
When we run this cell, the output will be a new DataFrame with all the rows that contain students who passed math.

```
# Get all the students that passed math in a new DataFrame.
passing_math = school_data_complete_df[school_data_complete_df["math_score"] >= 70]
passing_math.head()
```

	Student ID	student_name	gender	grade	school_name	reading_score	math_score	School ID	type	size	budget
0	0	Paul Bradley	M	9th	Huang High School	66	79	0	District	2917	1910635
4	4	Bonnie Ray	F	9th	Huang High School	97	84	0	District	2917	1910635
5	5	Bryan Miranda	M	9th	Huang High School	94	94	0	District	2917	1910635
6	6	Sheena Carter	F	11th	Huang High School	82	80	0	District	2917	1910635
8	8	Michael Roth	M	10th	Huang High School	95	87	0	District	2917	1910635

Now we can repurpose the code we wrote to calculate `passing_math` in order to find `passing_reading`, but we'll switch out `math_score` with `reading_score`, as shown in the following code:

```
# Get all the students that are passing reading in a new DataFrame.
passing_reading = school_data_complete_df[school_data_complete_df["reading_s
```

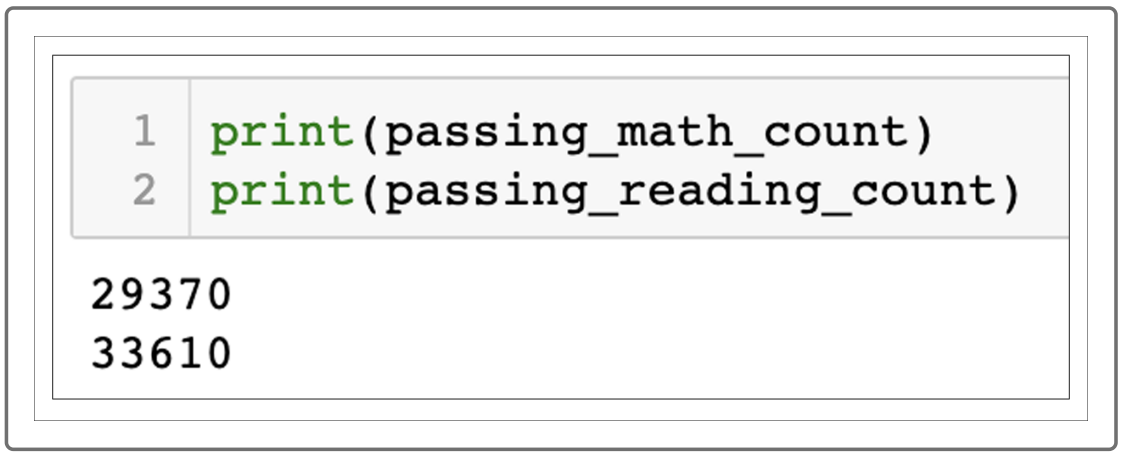


To get the number of students who passed math and reading, apply the `count()` method to the student_name column of the `passing_math` and `passing_reading` DataFrames, like this:

```
# Calculate the number of students passing math.
passing_math_count = passing_math["student_name"].count()

# Calculate the number of students passing reading.
passing_reading_count = passing_reading["student_name"].count()
```

When we execute this cell and print out the `passing_math_count` and the `passing_reading_count`, we get the number of students who passed math and the number of students who passed reading:



Great job on getting the `passing_math_count` and the `passing_reading_count`! Now we need to get the percentage of students who passed math and reading.

Get the Percentage of Students Who Passed Math and Reading

To get the percentage of students who passed math and reading, divide the `passing_math_count` and the `passing_reading_count` by the total number of students, and then multiply by 100.

REWIND

Recall that the student count was calculated using this code:

`school_data_complete_df["Student ID"].count()`

This gave us 39,170 students.

```
# Get the total number of students.
student_count = school_data_complete_df["Student ID"].count()
student_count
```

```
39170
```

Since we are calculating a percentage, we need to convert the `student_count` to a number with a decimal, or floating-point decimal, by using `float()`.

The final calculation should look like this:

```
# Calculate the percent that passed math.
passing_math_percentage = passing_math_count / float(student_count) * 100

# Calculate the percent that passed reading.
passing_reading_percentage = passing_reading_count / float(student_count) *
```

When we execute this cell and print out the `passing_math_percentage` and `passing_reading_percentage`, we get the percentage of students who passed math and the percentage of students who passed reading:

```
print(passing_math_percentage)
print(passing_reading_percentage)
```

```
74.9808526933878
85.80546336482001
```

We're almost done! Next, we need to calculate the percentage of students who passed both math and reading.

Calculate the Overall Passing Percentage

To get the overall passing percentage, we need to get all the students who passed *both* math and reading and divide by the total number of students.

We can filter the `school_data_complete_df` DataFrame by adding the `school_data_complete_df["math_score"] >= 70` and `school_data_complete_df["reading_score"] >= 70` with the logical operator "`&`" within brackets, like this:

```
# Calculate the students who passed both math and reading.
passing_math_reading = school_data_complete_df[(school_data_complete_df["mat

passing_math_reading.head()
```

When we run this cell, the output will be a new DataFrame with all the columns that contain students who passed both math and reading.

	Student ID	student_name	gender	grade	school_name	reading_score	math_score	School ID	type	size	budget
4	4	Bonnie Ray	F	9th	Huang High School	97	84	0	District	2917	1910635
5	5	Bryan Miranda	M	9th	Huang High School	94	94	0	District	2917	1910635
6	6	Sheena Carter	F	11th	Huang High School	82	80	0	District	2917	1910635
8	8	Michael Roth	M	10th	Huang High School	95	87	0	District	2917	1910635
9	9	Matthew Greene	M	10th	Huang High School	96	84	0	District	2917	1910635

Next, we'll get the total number of students who passed both math and reading.

To get the total number of students who passed both math and reading, we apply the `count()` method to the `passing_math_reading` DataFrame with the following code.

```
# Calculate the number of students who passed both math and reading.
overall_passing_math_reading_count = passing_math_reading["student_name"].co
overall_passing_math_reading_count
```

Finally, we calculate the percentage of students who passed both math and reading by dividing the total number of students and multiplying by 100, using the following code.

```
# Calculate the overall passing percentage.
overall_passing_percentage = overall_passing_math_reading_count / student_co
overall_passing_percentage
```

FINDING

When we run this cell, the percentage of students who passed both math and reading is 65.17232575950983.

This completes the data we need for the district summary. Now we'll add it to a new DataFrame.