Introduction

Prior to engaging in this hacktivity, you should have completed all of the pre-class activities as outlined in this module. At the start of class, you will be randomly assigned a partner to work with on the entirety of this hacktivity as a peer programming activity. Your instructor will inform you of your partner for this class.

One of you will be the driver and the other will take on the navigator role. Recall that a driver is in charge of the keyboard and computer while the navigator is in charge of the handout and directing the activity. However, you are both responsible for contributing and discussing solutions. If you were a driver/navigator in the prior activity, switch roles for this activity.

1 Knowledge Check

With your partner, discuss and answer each of the following questions, writing your answers down on a separate sheet of paper.

1. For each of the following variable names, discuss with your partner whether the variable names valid or invalid. If invalid, give a reason why. If valid, further discuss if the variable name is a “good” name or a “bad” name with some justification.

   a) num Students
   b) number_of_students
   c) 19950
   d) some@value
2. For each of the following code snippets, discuss whether or not they are syntactically correct. If it is not, provide some justification and fix the issue(s).

a) `var a = 10`
b) `var a = 10;

c) `set var a to 10;`
d) `var 10 = a;`
e) `var b = a + 10;`
f) `var b = a^2;`
g) `var b = sqrt(a);`
h) `var b = Math.sin(a);`

3. For each of the following code snippets, predict what the code snippet will print to the console. Verify your work by executing the code.

```
var a = 10;
var b = 20;
var c = a + b * b - (a * b);
console.log(c);
```

```
var a = 10;
var b = 20;
var c = 30;
var d = a + b * c;
console.log(d);
```
### 2 Getting Some Practice

#### 2.1 Temperature Conversion

Write a snippet of code that converts temperature from degrees Fahrenheit \( f \) to and from Celsius \( c \) which can be calculated using the following two formulas.

\[
c = \frac{5}{9}(f - 32)
\]

\[
f = \frac{9}{5}c + 32
\]

Use your program to answer the following:

1. What is 98.6 degrees Fahrenheit in Celsius?
2. What is -10 degrees Fahrenheit in Celsius?
3. What is 100 degrees Celsius in Fahrenheit?
4. What is 22.8 degrees Celsius in Fahrenheit?

#### 2.2 Sales Receipt

Recall that you can *prompt* a user for input by using the `prompt` function, which prints a message to the user:

```javascript
var x = prompt("Enter a value: ");
```
This creates a dialog box with a text input and the message **Enter a value:**. The value that the user enters is then stored in the variable `x`. However, it will be stored as a string even if it represents a number. To convert it to a number you can use one of the following depending on whether or not you want an integer or a decimal number.

```javascript
1  x = parseInt(x);
2  //or
3  x = parseFloat(x);
```

Similarly, the `alert` function can display a dialog box with a message: `alert("Hello!");`

In this exercise, work together to create a full program that simulates a receipt by doing the following:

1. Prompt the user to enter a sales sub-total
2. Prompt the user to enter a tax rate
3. Print a formatted message to the user detailing the sub-total, total tax and grand total of the sale.

**Note:** More recent versions of LightTable may not support the `prompt()` function. If your version of LightTable does not, you can instead use an online JavaScript execution environment. We recommend using [https://repl.it/languages/javascript](https://repl.it/languages/javascript).

Use your program to compute the following:

1. Sub-total: $150.50, sales tax: 6.5%
2. Sub-total: $25.33, sales tax: 3.125%
3. Sub-total: $578.99, sales tax: 7.8%
4. Sub-total: $345.13, sales tax: 2.484%

### 3 Program: Compound Interest

Suppose you deposit an amount $b$ (balance) into an interest bearing account paying an annual percentage rate (APR) of $r$ which is compounded $n$ times per year (for monthly accounts, $n = 12$). If we left the deposit to accrue interest for $t$ years the amount of money we’d have is given by the following formula:

\[ A = b \cdot \left(1 + \frac{r}{n}\right)^{nt} \]

where

- $A$ is the future value of the investment, including interest
- $b$ is the principal investment amount (the initial deposit or loan amount)
• $r$ is the annual percentage rate
• $n$ is the number of times that interest is compounded per year
• $t$ is the number of years the deposit is invested for

Write a program that prompts the user to enter values for $b, r,$ and $t$ (assume $n = 12$). Compute the value of the account after $t$ years and display a message to the user similar to the following:

With an initial deposit of $1000 at 5\%$ interest, after 2.5 years you would have $1132.85, making $132.85 in interest

Hint: how can you round to the nearest cent?