

CSCE 120: Learning To Code

Manipulating Data I Hacktivity 3.1

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`

- e) `aVariable001`
- f) `foobar`
- g) `function`
- h) `apr`
- i) `accountNumber`
- j) `shazam`
- k) `var`
- l) `ssn`
- m) `twitterPostId`

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.sine(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.

a)

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

b)

```
1 var a = 10;
2 var b = 20;
3 var c = 30;
4 var d = a + b * c;
5 console.log(d);
```

```

c) 1 var a = 10;
    2 var b = 20;
    3 var c = 30;
    4 var d = (a + b) * c;
    5 console.log(d);

d) 1 var a = 10;
    2 var b = 20;
    3 var c = 30;
    4 var d = a / b * Math.pow(c, 2);
    5 console.log(d);

e) 1 var a = 10;
    2 var b = 20;
    3 var c = 30;
    4 var d = Math.sqrt(a) * Math.sin(b) + c;
    5 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:

```
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.

```
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.

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?