Initial Diagnostic Exercises

SUBMIT HERE: https://classroom.github.com/a/5Vcmj5A_

The purpose of this assignment is to get a self-understanding of your current skills. Keep this assignment for us to discuss if there are any items you face difficulty with.

This assignment is graded on **effort and completeness**, not correctness. If you're unable to solve a problem, write any intermediate steps or related information that you do know. In the worst case, use pseudocode.

Types

1- Evaluate (Java):

- 5.0/2 = 3.5
- 10 % 3 = 1
- 3 / 3 + 5 * 3 = ? 16
- 2/3 = ? 1
- true || false true
- "Comp" + "Sci" CompSci
- "10" + "-1" 9
- "Belcalis Marlenis Almanzar".charAt(2) Almanzar
- String elem = "hydrogen"; 7
  elem.length();

Conditions

2- What does this code snippet print?

```
flavor = "vanilla";
double price;
switch (flavor) {
case "strawberry":
case "chocolate":
    price = 3.99;
    break;
case "vanilla":
    price = 3.49;
    break;

default:
    price = 0.0;
}
System.out.println("that will be " + price + " please.");
```

-

- What would the price be if the flavor was strawberry?
  3.99
- What is the price for a pistachio?
  0.0

3- Write a condition that is only true if an integer, x, is divisible by 4 or 7.

```
Int x;
if( x% 4 == 0){
system.out.println(“the number is divisible by 4”);
}
Else if( x%7 == 0){
system.out.println (“the number is divisible by 7”);
}
Else{
system.out.println(“the number isn’t divisible by 4 or 7, try again.”);
}
}
```

4- Are these two code snippets different? Why or why not?

```
if (show.funny) {
    System.out.println("This show is funny");
} else if (show.cartoon) {
    System.out.println("This is an animated show.");
} else {
    System.out.println("This is a good show.");
}

// versus

if (show.funny) {
    System.out.println("This show is funny");
}
if (show.cartoon) {
    System.out.println("This is an animated show.");
} else {
    System.out.println("This is a good show.");
}
```

-

The first snippets will only print one of the if statements, while the second will print 2 statement.

Loops

5- Create a for loop that prints the *cubes* (x^3) of all integers from -10 to 10

```
Int x;
for(x = -10; x< 11; x++){
 Square = x*x;
cube= Square * x;

system.out.println( x+ “ “ square +” “ + cube);
```

6- What is the output of this snippet?

```
float score = 0;
while (score < 1) {
    score += .1;
    System.out.println(score);
    if (score == .5) {
        break;
    }
}
```

It will print out 0.1

Functions

7- Consider this function

```
private static String  mysteryFn(String input) {
    String output = "";
    for (int i = 0; i < input.length(); i++) {
        if (
                input.charAt(i) == 'a' || input.charAt(i)  == 'e' ||
                input.charAt(i)  == 'i' || input.charAt(i)  == 'o' ||
                input.charAt(i)  =='u'
        ) {
            continue;
        }
        output += input.charAt(i);
    }
    return output;
}
```

- What is the return type?
- It will print one the following ‘a’ ‘e’ ‘i’ ‘o’ ‘u’ and also find out how many vowels are there

- What is the parameter type?
- String mysteryFn

- What does it do?
- It print outs how many vowels in the lines

- What is the result of mysteryFn(“Woah, we're half way there”)
- The sentence will have 8 vowels.

- Is there a case that it does not solve correctly?
- If there a line were the vowels doesn't apper.

Arrays

8- Write the implementation of a function that takes 2 arguments (an int array and two integer indices) and swaps the elements in the two indices of the array.

```
public static void swap(int[] distances, int index1, int index2) {


}
```

```
Public static void swap(int[] distances, int index1, int index2){
        Int temp = distance [index1];

        Distance[index1] = distances[index2];
        Distance[index2] =  temp;
```

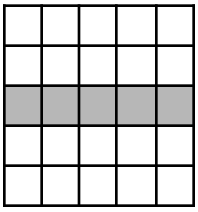
9- Write a code snippet that prints the values in an array **backwards**.

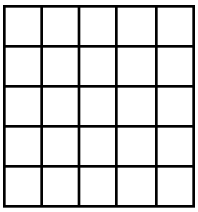
```
char[] flags = {'c', 'f', 'l', 'b', 'a'};
```

```
for(int i=flags.length -1; i>= 0; i--){
system.out.println(flags[i] + " ");
}
```

10- Write code that prints the values in the 3rd row of this 2D array

```
String[][] classroom = new String[10][5]; // rows x cols
// [... filled in names of students ...]
```





```
for(int i =0; i< classroom.length;i++){
        system.out.print();
for(int j = 0; j,classroom[i].length; j++){
        System.out.print (classroom[i][j]);
```

Objects and Polymorphism

11- Consider this code and the following snippet;
Code:

```
public class Goomba extends Character {
    public static String[] powers = { "side_attack" };

    private int size;

    public Goomba(String name, int size) {
        super(name);
        this.size = size;
    }

    public static void addPower(String newPower) {
        // updates powers static variable to include new power
    }

    public int getSize() {
        return this.size;
    }

}
```

Snippet:

```
Goomba g1 = new Goomba("g1", 10);
Goomba.addPower("climb_walls");
Goomba g2 = new Goomba("g2", 10);
```

- What does the **super** call do?
  The super is call to do method the parent class.

- What does this.size = size do?
- Is to clarify that size is equal to this.size only.

- What powers does g1 have at the end of the snippet?
- side_attack

- What powers does g2 have at the end of the snippet?
- climb_walls

- System.***out***.println(Goomba.*powers*) prints: [Ljava.lang.String;@6aaa5eb0
  What is this value?

  It will return N/A

12-

- What is an interface?
- An interface is a abstract type that contains a collection of methods and other type of variables.

- What is an abstract class?
- Is a class that declared abstract

- Why would you use one or the other?
- The use of the interface will use both abstract and other variable, so it will act like a guild while a abstract will be like a parent class.

I/O

13- Write a snippet that will read from input continuously until the user types ‘q’.
(refer to the attached Scanner API if you need to)

```
Scanner s = new scanner;
for( int i = 0; i < s.length; s++){
If (s == “q”){
system.out.println(“all done”);
Else{
system.out.println( s);
```

Math Foundations

14- Evaluate or Approximate

If you approximate, indicate if the actual value is greater/less than your approximation.

Example: 1000/999 = little more than 1

25/3 = little more than 1

10^-1 = less than 1
2^5 = more that 1(32)
3^4 = more than 1(81)
5^2 = more than 1 (25)
82^(.5) = less than 1
6! = more than 1
log(100) = more than 1(2)
log(1000) = more than 1 (3)
log(log(10000000000)) = equal to 1

Recursion

15-

```
// assume x >= 0
public static void mystery1(int x) {
    System.out.print(x % 10);
    if (x / 10 != 0) {
        mystery1(x / 10);
    }
}

// assume x >= 0
public static void mystery2(int x) {
    if (x / 10 != 0) {
        mystery2(x / 10);
    }
    System.out.print(x % 10);
}
```

What is the value of:

mystery1(5678)? 0.08

mystery2(5678)?6.78
