CPSC 1150: Practice Midterm Questions

Problem solving and programming

1. Design an algorithm that accepts a number as a parameter and prints to the console the sum of all the numbers up to and including that number

2. Design an algorithm that reads a string from the user and counts the number of vowels within the string

3. Design an algorithm that reads a number from the user and returns the reverse of that number. You may **not** use any String or Array methods to complete this exercise.

4. Design an algorithm that checks whether a passed string is palindrome or not. A string is called palindrome if you can read the same word from both sides. For example, “Dad” and “Rotator” are palindrome.

5. Design an algorithm that accepts an integer N from the user, and prints out all of the prime numbers up to N.

6. Design an algorithm that imitates the behaviour of Math.pow(). Your program should read two numbers, say b and n from the user, and then compute the value of b^n where n is the exponent and b is the base. Your program should then print the result. You may **not** use Math.pow to complete this exercise.

7. Design an algorithm to read several integers from the user until the user enters 0. Your program should then print out the largest and the smallest numbers entered by the user.

8. Design an algorithm to read an integer from the user. Your program should then print out of the number of even, odd, and zero digits the number contained. You cannot use any String or Array methods to complete this exercise.

9. Design an algorithm to read two Strings from the user, phrase and letter. Your program should then find the first occurrence of the letter in phrase and print the index at which it occurs. If letter does not occur in phrase, then your program should print -1.
   Ex. if the user `enters phrase=“potato soup”` and `letter=“s”` your program should print `“index: 7”`
   Ex. if the user `enters phrase=“potato soup”` and `letter=“r”` your program should print `“index:-1”`

10. Write a program in Java that generates a random letter and asks user for a guess. It then prints out an appropriate message if the guessing letter is correct or not. The program is not case-sensitive.

11. Write a program in Java that given two numbers and an operator it calculates and prints the result of the operation in 2 digits after decimal point. The input numbers can be double values and the operator is +, -, *, / or %. Any operator other then that should be reported as wrong operator to user.

Code Tracing

1. Evaluate the following expressions:

Expression	Result
(37 % 4) - 2 * 4	
(3 + 4) % 3 + 4 * 4	
(14 <= 7 * 2) && (100 / 4) < 15	
49 % (10 - 3) < 56 % 8	
true || !true	
((12 > 11) && true) ^ (!true || (3 > 5))	

2. Read through the following code.

```
if (num1 >= num2){
   System.out.println ("Harry");
   System.out.println ("Ron");
}
if ((num1 + 5) >= num2)
   System.out.println("Hermione");
else
  switch(num2%3){
         case 0:
               System.out.println("Fred");

         case 1:
               System.out.println("George");

         case 2:
               System.out.println("Ginny");
               break;
  }
System.out.println("Voldemort");
```

What is printed to the screen in each of the following cases?

a. When num1 = 5 and num2 = 6
b. When num1 = 6 and num2 = 12
c. When num1 = 12 and num2 = 26
d. When num1 = 3 and num2 = 3

Number System

1. Convert 18FA in hexadecimal to binary, decimal and octal system. Show your work.
2. Assume -4536 is a short number in Java. What is the binary representation of this number? Show your work.