

## Lab 7

1-)

1. Identify all the errors in the following repetition statements. Some errors are syntactical while others are logical (e.g., infinite loops).

a. `for (int i = 10; i > 0; i++) {`  
    `x = y;`  
    `a = b;`  
    `}`

b. `int sum = 0;`  
    `Scanner scanner = new Scanner(System.in);`  
    `do {`  
        `num = scanner.nextInt();`  
        `sum += num;`  
    `} until (sum > 10000);`

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c. `while (x < 1 && x > 10) {`  
    `a = b;`  
    `}`

d. `while (a == b) ;`  
    `{`  
        `a = b;`  
        `x = y;`  
    `}`

2-)

Write for, do-while, and while statements to compute the following sums and products.

- a.  $1 + 2 + 3 + \cdots + 100$
- b.  $5 + 10 + 15 + \cdots + 50$

3-)

Write a program to print out the numbers 10 through 49 in the following manner:

```
10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28 29
30 31 32 33 34 35 36 37 38 39
40 41 42 43 44 45 46 47 48 49
```

4-)

- A *prime number* is an integer greater than 1 and divisible by only itself and 1. The first seven prime numbers are 2, 3, 5, 7, 11, 13, and 17. Write a method that returns true if its parameter is a prime number. Using this method, write a program that repeatedly asks the user for input and displays **Prime** if the input is a prime number and **Not Prime**, otherwise. Stop the repetition when the input is a negative number.

5-) Optional

There are 25 primes between 2 and 100, and there are 1229 primes between 2 and 10,000. Write a program that inputs a positive integer  $N > 2$  and displays the number of primes between 2 and  $N$  (inclusive).

6-) Optional

- A *perfect number* is a positive integer that is equal to the sum of its proper divisors. A proper divisor is a positive integer other than the number itself that divides the number evenly (i.e., no remainder). For example, 6 is a perfect number because the sum of its proper divisors 1, 2, and 3 is equal to 6. Eight is not a perfect number because  $1 + 2 + 4 \neq 8$ . Write a program that accepts a positive integer and determines whether the number is perfect. Also, display all proper divisors of the number. Try a number between 20 and 30 and another number between 490 and 500.