American University of Beirut
Department of Computer Science
CMPS 200 – Introduction to Programming
Lab 4: Feb 21 – Feb 24

Exercise 1. Basics - Revisited

Indicate the size in bytes for each of the following datatypes:

int:

float:

double:

byte:

long:

char:

Which of the following codes have compile errors? How to fix them?

```
int i = 10;
byte b = i;
```

```
byte b = 35;
int j = b;
```

```
float f = 12.56F;
double d = f;
```

```
double d = 12.67;
float f = d;
```

```
long l = 1234L;
int i = l;
```

```
int i = 12456;
long l = i;
```

```
int i = 12;
char c = i;
```

```
char c = 'b';
int i = c;
double d = c;
```

What is printed by each of the following println statements?

```
char c1 = 'f';
char c2 = 'h';
System.out.println(c1 - c2);


System.out.println(c2 / c1);


System.out.println(c1.toUpperCase());
```

Exercise 2. Tracing IF statements

Check the following Java code:

```
public static void ifElse(int x, int y){
  int z = 4;
  if (z <= x) {
     z = x + 1;}
  else {
     z = z + 9;}

  if (z <= y) {
     y = y + 1;}
     System.out.println(z + " " + y);
}
```

Indicate what is the output for each of the following method calls:

```
ifElse(3, 25)

ifElse(6, 10)

ifElse(5, 5)
```

Exercise 3. Simple Selection

Create a program that asks the user to enter his/her age. It then displays either "Access granted" when the age is above 18, or "Access denied" otherwise.

Exercise 4. GPA Distinction

Create a program that asks the user to enter his/her GPA value (number between 0 and 4), and displays the appropriate distinction as follows:

- >= 3.8: High Distinction
- between 3.5 and 3.79: Distinction
- between 3.2 and 3.49: Honor
- < 3.2: None

You may create a method that takes the numerical GPA and returns the corresponding distinction.

Exercise 5. Leap Year

Compose a program that asks the user to enter a positive integer representing a year number, and prints either "Leap year" or "Not a leap year". A leap year is a year divisible by 4 but not by 100 or is divisible by 400.

Exercise 6. Vowel Letter

Write a JAVA program that asks the user for a single character and determines whether that character is a vowel or consonant.

The program must validate that the user has entered a single character and that this single character is an alphabet letter. Some string and character methods that may be useful:

`Character.isAlphabetic(), s.length(), s.indexOf("st")…`

Sample Executions:

```
Enter a character: ?
Invalid. This is not an alphabet letter.
```

```
Enter a character: abc
Invalid. You entered more than one character.
```

```
Enter a character: d
d is a consonant letter
```

```
Enter a character: o
o is a vowel letter
```

Exercise 7. Unique Numbers

Write a method named **uniqueNumbers** that accepts three integers as parameters and that returns the number of unique integers among the three. For example, the call **uniqueNumbers** (18, 3, 4) should return 3 because the parameters have 3 different values. By contrast, the call **uniqueNumbers** (6, 7, 6) would return 2 because there are only 2 unique numbers among the three parameters: 6 and 7. Test your code on different input taken from the user (as console input or command line arguments).