

Assignment (Part 1)
Introduction to Java Applications, Input/Output and Operators

1. **(Arithmetic)** Write an application that asks the user to enter two integers, obtains them from the user and prints their sum, product, difference and quotient (division).
2. **(Comparing Integers)** Write an application that asks the user to enter two integers, obtains them from the user and displays the larger number followed by the words "is larger". If the numbers are equal, print the message "These numbers are equal".
3. **(Arithmetic, Smallest and Largest)** Write an application that inputs three integers from the user and displays the sum, average, product, smallest and largest of the numbers.
4. **(Odd or Even)** Write an application that reads an integer and determines and prints whether it's odd or even.
5. **(Multiples)** Write an application that reads two integers, determines whether the first is a multiple of the second and prints the result.

6. **(Checkerboard Pattern of Asterisks)** Write an application that displays a checkerboard pattern, as follows:

```
* * * * *
 * * * * *
* * * * *
 * * * * *
* * * * *
 * * * * *
* * * * *
 * * * * *
```

7. **(Diameter, Circumference and Area of a Circle)** Write an application that inputs from the user the radius of a circle as an integer and prints the circle's diameter, circumference and area using the floating-point value 3.14159 for π .

[Note: You may use the predefined constant `Math.PI` for the value of π where Class `Math` is defined in package `java.lang`] Use the following formulas (r is the radius):

$$\text{diameter} = 2r$$

$$\text{circumference} = 2\pi r$$

$$\text{area} = \pi r^2$$

Do not store the results of each calculation in a variable. Rather, specify each calculation as the value that will be output in a `System.out.printf` statement. The values produced by the circumference and area calculations are floating-point numbers.

8. **(Integer Value of a Character)** Write an application that displays the integer equivalents of some uppercase letters, lowercase letters, digits and special symbols. Display the integer equivalents of the following: A B C a b c 0 1 2 \$ * + / and the blank character.

[Hint: You can determine a character's integer equivalent by preceding that character with (int), as in (int) 'A']

9. **(Separating the Digits in an Integer)** Write an application that inputs one number consisting of five digits from the user, separates the number into its individual digits and prints the digits separated from one another by three spaces each. For example, if the user types in the number 42339, the program should print

4 2 3 3 9

10. **(Table of Squares and Cubes)** Write an application that calculates the squares and cubes of the numbers from 0 to 10 and prints the resulting values in table format, as shown below.

[Note: This program does not require any input from the user.]

number	square	cube
0	0	0
1	1	1
2	4	8
3	9	27
4	16	64
5	25	125
6	36	216
7	49	343
8	64	512
9	81	729
10	100	1000

11. **(Negative, Positive and Zero Values)** Write a program that inputs five numbers and determines and prints the number of negative numbers input, the number of positive numbers input and the number of zeros input.
12. **(Body Mass Index Calculator)** Formulas for calculating BMI are as follows:

$$BMI = \frac{\text{weightInPounds} \times 703}{\text{heightInInches} \times \text{heightInInches}} \quad \text{or} \quad BMI = \frac{\text{weightInKilograms}}{\text{heightInMeters} \times \text{heightInMeters}}$$

Create a BMI calculator that reads the user's weight in pounds and height in inches (or, if you prefer, the user's weight in kilograms and height in meters), then calculates and displays the user's body mass index. Also, display the following information from the Department of Health and Human Services/National Institutes of Health so the user can evaluate his/her BMI:

BMI VALUES
 Underweight: less than 18.5
 Normal: between 18.5 and 24.9
 Overweight: between 25 and 29.9
 Obese: 30 or greater

13. **(Car-Pool Savings Calculator)** Research several car-pooling websites. Create an application that calculates your daily driving cost, so that you can estimate how much money could be saved by car pooling, which also has other advantages such as reducing carbon emissions and reducing traffic congestion. The application should input the following information and display the user's cost per day of driving to work:
- (a) Total miles driven per day
 - (b) Cost per gallon of gasoline
 - (c) Average miles per gallon
 - (d) Parking fees per day
 - (e) Tolls per day