Task No 01: Write a program that prints a mosque, by using JAVA.

Code:

```
package com.mycompany.lab01task01;

public class Lab01task01 {

    public static void main(String[] args) {
        System.out.println("  ^                ^                  ^");
        System.out.println(" {|}              {|}                {|}");
        System.out.println(" {.}             {{|}}              {.}");
        System.out.println(" {.}            {{{|}}}             {.}");
        System.out.println(" {.}           {{{{|}}}}            {.}");
        System.out.println(" {.}            {{{|}}}             {.}");
        System.out.println(" {.}             {{|}}              {.}");
        System.out.println("{ ++++++++++++++++++++++++++++++++}");
        System.out.println("{++++++++++++++++++++++++++++++++++}");
        System.out.println("{ |                  _             |}");
        System.out.println("{ |                {#}             |}");
        System.out.println("{ |              {#####}           |}");
        System.out.println("{ |   __                    __     |}");
        System.out.println("{ |  |###|    {#######}    |###|  |}");
        System.out.println("{ |  |###|    {#######}    |###|  |}");
        System.out.println("{ |  =====    {#######}    =====  |}");
        System.out.println("{ |           {#######}           |}");
        System.out.println("{ |           {#######}           |}");
        System.out.println("{ |           {#######}           |}");
        System.out.println("{############==========############}");
        System.out.println("{$$$$$$$$$$$$==========$$$$$$$$$$$$}");
        System.out.println("{@@@@@@@@@@@@==========@@@@@@@@@@@@}");
        System.out.println("{&&&&&&&&&&&&==========&&&&&&&&&&&&}");
    }
}
```

Output:

```
--- exec-maven-plugin:3.0.0:exec (default-cli) @ Lab01task01 ---
  ^                ^                  ^
 {|}              {|}                {|}
 {.}             {{|}}              {.}
 {.}            {{{|}}}             {.}
 {.}           {{{{|}}}}            {.}
 {.}            {{{|}}}             {.}
 {.}             {{|}}              {.}
{ ++++++++++++++++++++++++++++++++}
{++++++++++++++++++++++++++++++++++}
{ |                  _             |}
{ |                {#}             |}
{ |              {#####}           |}
{ |   __                    __     |}
{ |  |###|    {#######}    |###|  |}
{ |  |###|    {#######}    |###|  |}
{ |  =====    {#######}    =====  |}
{ |           {#######}           |}
{ |           {#######}           |}
{ |           {#######}           |}
{############==========############}
{$$$$$$$$$$$$==========$$$$$$$$$$$$}
{@@@@@@@@@@@@==========@@@@@@@@@@@@}
{&&&&&&&&&&&&==========&&&&&&&&&&&&}
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
Total time:  1.767 s
Finished at: 2023-02-28T09:20:18+05:00
------------------------------------------------------------------------
```

Task No 02: Write a JAVA program, which receives the input of two integer numbers, operation (+, -, *, /, %, power, square-root, and factorial) and compute athematic operations. Generate a menu for operations and ask user after every operation if they want to do another. (Hint use switch case)

Code:

```
package com.mycompany.lab01task02;

import java.util.Scanner;

public class Lab01task02 {

    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        int opp;
        char rep;
        System.out.println("\n---Arithematic Calculator---");
        System.out.println("\nDo you want to perform any Arithematic
Operation?");
        System.out.println(" If yes, reply with y....");
        rep = input.next().charAt(0);

        while (rep == 'y' || rep == 'Y') {
            System.out.println("\nSelect the Operation");
            System.out.println("1) Addition\n2) Substraction\n3)
Multiplication\n4) Division\n5) Power\n6) Square Root");
            System.out.println("\nReply between 1 to 6....");
            opp = input.nextInt();
            switch (opp) {
                case 1:
                    double a,b;
                    double sum;
                    System.out.print("Enter the first number: ");
                    a = input.nextDouble();
                    System.out.print("Enter the second number: ");
                    b = input.nextDouble();
                    sum = a + b;
                    System.out.println("The Sum is: " + sum);
                    System.out.println("\nDo you want to perform any other
Operation?");
                    break;
                case 2:
                    double sub;
                    System.out.print("Enter the first number: ");
                    a = input.nextDouble();
                    System.out.print("Enter the second number: ");
                    b = input.nextDouble();
                    sub = a - b;
                    System.out.println("The Difference is: " + sub);
                    System.out.println("\nDo you want to perform any other
Operation?");
```

```
                    break;
                case 3:
                    double prod;
                    System.out.print("Enter the first number: ");
                    a = input.nextDouble();
                    System.out.print("Enter the second number: ");
                    b = input.nextDouble();
                    prod = a * b;
                    System.out.println("The Product is: " + prod);
                    System.out.println("\nDo you want to perform any other
Operation?");
                    break;
                case 4:
                    double divd;
                    System.out.print("Enter the first number: ");
                    a = input.nextDouble();
                    System.out.print("Enter the second number: ");
                    b = input.nextDouble();
                    divd = a / b;
                    System.out.println("The answer is: " + divd);
                    System.out.println("\nDo you want to perform any other
Operation?");
                    break;
                case 5:
                    double power;
                    System.out.print("Enter the number: ");
                    a = input.nextDouble();
                    System.out.print("Enter the Power: ");
                    b = input.nextDouble();
                    power = Math.pow(a, b);
                    System.out.println("The answer is: " + power);
                    System.out.println("\nDo you want to perform any other
Operation?");
                    break;
                case 6:
                    double squareRoot;
                    System.out.print("Enter the number: ");
                    a = input.nextDouble();
                    squareRoot = Math.sqrt(a);
                    System.out.println(String.format("The squareroot of %f is:
%f", a, squareRoot));
                    System.out.println("\nDo you want to perform any other
Operation?");
                    break;
                default:
                    System.out.println("Invalid Input! Please reply between 1 to
6....\n");
                    break;
            }
        }
    }
}
```

Output:

```
--- exec-maven-plugin:3.0.0:exec (default-cli) @ Lab01task02 ---

---Arithematic Calculator---

Do you want to perform any Arithematic Operation?
 If yes, reply with y....
y

Select the Operation
1) Addition
2) Substraction
3) Multiplication
4) Division
5) Power
6) Square Root

Reply between 1 to 6....
3
Enter the first number: 5
Enter the second number: 9
The Product is: 45.0

Do you want to perform any other Operation?

Select the Operation
1) Addition
2) Substraction
3) Multiplication
4) Division
```

Task No 03: Make a program in JAVA in which take no. of items, price of items and name of items as input from the user and give the discount according to the following conditions:

a) If from Bahria University give discount of 30%.
b) Else if the total amount is greater than 50,000 and less than 100,000 give discounts of 20%.
c) Else if the total amount is greater than 100,000 give discounts of 30%.

Code:

```java
package com.mycompany.lab01task03;

import java.util.Scanner;

public class Lab01task03 {

    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);

        double amount, discount, total = 0;

        System.out.print("Enter the mumber of items you have purchased: ");
        int number = input.nextInt();
        int price[] = new int[number];

        for (int i = 0; i < number; i++) {
            System.out.println("Enter the name of item " + (i + 1));
```

```
            String items = input.next();
            System.out.println("Enter the price ");
            price[i] = input.nextInt();
            total = total + price[i];
        }

        System.out.println("\nAre you from Bahria University?");
        System.out.println(" If yes, reply with y otherwise n....");
        char rep = input.next().charAt(0);
        if (rep == 'y' || rep == 'Y') {
            discount = total * (0.3);
            amount = total - discount;
            System.out.println(String.format("\nYour final bill is %f Rs with 30
Percent Discount.", amount));
        } else if (rep == 'n' || rep == 'N') {
            if (total >= 50000 && total <= 100000) {
                discount = total * (0.2);
            } else if (total >= 100000) {
                discount = total * (0.3);
            } else {
                discount = 0;
            }
            amount = total - discount;
            System.out.println(String.format("\nYour final bill is %f Rs with the
discount of Rs %f.", amount, discount));
        } else {
            System.out.println(" Invalid Input! Please reply with y or n....");
        }
    }
}
```

Output:

```
--- exec-maven-plugin:3.0.0:exec (default-cli) @ Lab01task03 ---
Enter the mumber of items you have purchased: 2
Enter the name of item 1
Apple
Enter the price
120
Enter the name of item 2
Mango
Enter the price
140

Are you from Bahria University?
 If yes, reply with y otherwise n....
y

Your final bill is 182.000000 Rs with 30 Percent Discount.
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
Total time:  47.806 s
Finished at: 2023-02-28T09:23:58+05:00
------------------------------------------------------------------------
```

Task No 04: Write a JAVA program which will implement the following formulae using methods.

a) **Automobile Tire Pressure. P = 0.37m(T + 460)/V**

Where:

P = Pressure in psi.

V = Volume in cubic feet

m = Mass of air in pounds

T = Temperature in Fahrenheit

b) **Pulley formulas:**

i) Calculate the speed of one pulley if there are 2 pulleys connected with a belt:

RPM2 = Diameter1/Diameter2 * RPM1

ii) Calculate the amount of weight that can be lifted with a multiple pulley system:

Weight Lifted = Force Exerted * Number of up Ropes

c) **The body mass index (BMI):**

$$\text{BMI} = \frac{\text{mass(lb)}}{(\text{height(in)})^2} \times 703$$

Where mass is the subject's weight in pounds (lb.) and height is the height in inches (in). The value 703 is a factor to convert BMI to a value that matches the original BMI calculations done in metric units (i.e., Kilograms-Meters).

Code:

```
package com.mycompany.lab01task04;

import java.util.Scanner;

public class Lab01task04 {

    static Scanner input = new Scanner(System.in);

    static double calculatePressure() {
        double p, m, t, v, a, b;

        System.out.println("\n---Automobile Tyre Pressure Calculator---");
        System.out.println("Enter the Mass of air in pounds:");
        m = input.nextDouble();
        System.out.println("Enter Temperature in Fahrenheit:");
        t = input.nextDouble();
```

```
        System.out.println("Enter Volume in cubic feet:");
        v = input.nextDouble();

        a = m * (t + 460);
        b = 0.37 / v;
        p = a * b;
        return p;
    }

    static double calculateRPM2() {
        double RPM2, a, d1, d2, RPM1;

        System.out.println("\n---Two pulleys System---");
        System.out.println("Enter the diameter of Pulley 1 (in meter):");
        d1 = input.nextDouble();
        System.out.println("Enter the Speed of Pulley 1 (in RPM):");
        RPM1 = input.nextDouble();
        System.out.println("Enter the diameter of Pulley 2 (in meter):");
        d2 = input.nextDouble();
        a = d1 / d2;
        RPM2 = a * RPM1;
        return RPM2;
    }

    static double calculateWeight() {

        double force, weight;
        int ropes;

        System.out.println("\n---Multiple pulleys System---");
        System.out.println("Enter the Force exerted (in Newtons):");
        force = input.nextDouble();
        System.out.println("Enter the number of Ropes:");
        ropes = input.nextInt();

        weight = force * ropes;
        return weight;
    }

    static double calculateBMI() {

        double BMI, a, m, h;

        System.out.println("\n---Body Mass Index---");
        System.out.println("Enter your weight in Pounds:");
        m = input.nextDouble();
        System.out.println("Enter your height in inches:");
        h = input.nextDouble();
        a = m / (h * h);
        BMI = a * 703;
        return BMI;
    }
```

```
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        char rep;
        System.out.println("What do you want to calculate?");
        System.out.println("a) Automobile Pressure\nb) Pulley systems\nc) Body
Mass Index (BMI)");
        System.out.println("\nReply with a,b or c......");

        rep = input.next().charAt(0);

        switch (rep) {
            case 'a':
                System.out.println(String.format("Pressure is %,.2f psi",
calculatePressure()));
                break;

            case 'b':
                int rep1;
                System.out.println("\n---Pulley Systems---");
                System.out.println("How many pulleys are there in your system:");
                System.out.println("1) Only two Pulleys. \n2) Multiple
Pulleys.");
                System.out.println("Reply with 1 or 2.....");
                rep1 = input.nextInt();
                if (rep1 == 1) {
                    System.out.println(String.format("The speed of 2nd Pulley is
%,.2f RPM", calculateRPM2()));
                } else if (rep1 == 2) {
                    System.out.println(String.format("The total weight that can
be lifted with Pulley system is %,.2f KG", calculateWeight()));
                } else {
                    System.out.println("Invalid Input! Please Reply with 1 or
2......");
                }
                break;

            case 'c': {
                System.out.println(String.format("The value of BMI is %,.2f Kg/m-
square", calculateBMI()));
            }
            default:
                System.out.println("Invalid Input! Please Reply with a, b or
c......");
                break;
        }
    }
}
```

Output:

A)

```
--- exec-maven-plugin:3.0.0:exec (default-cli) @ Lab01task04 ---
What do you want to calculate?
a) Automobile Pressure
b) Pulley systems
c) Body Mass Index (BMI)

Reply with a,b or c......
a

---Automobile Tyre Pressure Calculator---
Enter the Mass of air in pounds:
2
Enter Temperature in Fahrenheit:
76
Enter Volume in cubic feet:
2
Pressure is 198.32 psi
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
Total time:  18.436 s
Finished at: 2023-02-28T13:37:38+05:00
------------------------------------------------------------------------
```

Bi)

```
--- exec-maven-plugin:3.0.0:exec (default-cli) @ Lab01task04 ---
What do you want to calculate?
a) Automobile Pressure
b) Pulley systems
c) Body Mass Index (BMI)

Reply with a,b or c......
b

---Pulley Systems---
How many pulleys are there in your system:
1) Only two Pulleys.
2) Multiple Pulleys.
Reply with 1 or 2.....
1

---Two pulleys System---
Enter the diameter of Pulley 1 (in meter):
3
Enter the Speed of Pulley 1 (in RPM):
60
Enter the diameter of Pulley 2 (in meter):
2
The speed of 2nd Pulley is 90.00 RPM
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
Total time:  33.601 s
Finished at: 2023-02-28T13:39:41+05:00
------------------------------------------------------------------------
```

Bii)

```
--- exec-maven-plugin:3.0.0:exec (default-cli) @ Lab01task04 ---
What do you want to calculate?
a) Automobile Pressure
b) Pulley systems
c) Body Mass Index (BMI)

Reply with a,b or c......
b

---Pulley Systems---
How many pulleys are there in your system:
1) Only two Pulleys.
2) Multiple Pulleys.
Reply with 1 or 2.....
2

---Multiple pulleys System---
Enter the Force exerted (in Newtons):
60
Enter the number of Ropes:
5
The total weight that can be lifted with Pulley system is 300.00 KG
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
Total time:  16.986 s
Finished at: 2023-02-28T13:41:27+05:00
------------------------------------------------------------------------
```

C)

```
--- exec-maven-plugin:3.0.0:exec (default-cli) @ Lab01task04 ---
What do you want to calculate?
a) Automobile Pressure
b) Pulley systems
c) Body Mass Index (BMI)

Reply with a,b or c......
c

---Body Mass Index---
Enter your weight in Pounds:
100
Enter your height in inches:
67
The value of BMI is 15.66 Kg/m-square
Invalid Input! Please Reply with a, b or c......
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
Total time:  18.796 s
Finished at: 2023-02-28T13:43:02+05:00
------------------------------------------------------------------------
```