

CS 1073

FR03A

Assignment #4

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## Section 1

```
/**
 * @author Ethan McCarthy 3573807
 */

public class CirclePan{
    private double radius;

    private double depth;

    /**
     * constructor to make the circle pan
     * @param radiusIn radius input
     * @param depthIn depth input
     */
    public CirclePan (double radiusIn, double depthIn){
        radius = radiusIn;
        depth = depthIn;
    }

    /**
     * get the radius of the pan
     * @return the radius of the pan
     */
    public double getRadius(){
        return radius;
    }

    /**
     * get the depth of the pan
     * @return the depth of the pan
     */
    public double getDepth(){
        return depth;
    }

    /**
     * method to calculate the surface area of the pan and return it
     * @return the total surface area
     */
    public double surfaceArea(){
        double area = (Math.PI * radius * radius) + (Math.PI * 2 * radius *
depth);
        return area;
    }
}
```

```

    }

    /**
     * method to calculate the total volume of the pan
     * @return the total volume of the pan
     */
    public double calcVolume(){
        double volume = (Math.PI * radius * radius * depth);
        return volume;
    }
}

```

```

/**
 * @author Ethan McCarthy 3573807
 */

public class HexagonPan{
    private double baseEdge;
    private double depth;
    private double baseArea;

    /**
     * hexagon pan constructor
     * @param baseEdgeIn edge of base
     * @param depthIn depth
     */
    public HexagonPan (double baseEdgeIn, double depthIn){
        baseEdge = baseEdgeIn;
        depth = depthIn;
        baseArea = (((3*Math.sqrt(3))/2) * (baseEdgeIn * baseEdgeIn));
    }

    /**
     * get edge of base
     * @return base edge
     */
    public double getBaseEdge(){
        return baseEdge;
    }

    /**
     * get the depth of the pan
     * @return depth

```

```

    */
    public double getDepth(){
        return depth;
    }

    /**
     * get the area of the base of the pan
     * @return area of the base
     */
    public double getBaseArea(){
        return baseArea;
    }

    /**
     * method to calculate the total surface area of the pan
     * @return the total surface area
     */
    public double surfaceArea(){
        double surfaceArea;
        surfaceArea = baseArea + (baseEdge * 6 * depth);
        return surfaceArea;
    }

    /**
     * method to calculate the volume of the cake pan
     * @return the total volume that the pan can hold
     */
    public double volume(){
        double volume;
        volume = baseArea * depth;
        return volume;
    }
}

```

```

/**
 * @author Ethan McCarthy 3573807
 */
import java.util.Scanner;
import java.text.NumberFormat;

public class PanDriver{
    public static void main (String[] args){
        Scanner scan = new Scanner(System.in);
    }
}

```

```

NumberFormat formatter = NumberFormat.getNumberInstance();
formatter.setMaximumFractionDigits(3);
formatter.setMinimumFractionDigits(3);

double leastArea = 0;
String type = "N/A";
double mostVolume = 0;

System.out.println("Select one of the following options: \n1 - Enter
information for a circle pan\n2 - Enter information for a hexagon pan\n3 -
Quit");

System.out.println("Enter your choice: ");
int userIn = scan.nextInt();

while(userIn != 3){
    if (userIn == 1){
        System.out.println("Input depth of the pan (in cm): ");
        double depthIn = scan.nextDouble();

        while(depthIn <= 0){
            System.out.println("Invalid input. Please enter a number
greater than 0.");
            depthIn = scan.nextDouble();
        }

        System.out.println("Input the radius of the pan (in cm): ");
        double radiusIn = scan.nextDouble();

        while(radiusIn <= 0){
            System.out.println("Invalid input. Please enter a number
greater than 0.");
            radiusIn = scan.nextDouble();
        }

        CirclePan circlePan = new CirclePan(radiusIn, depthIn);
        System.out.println("Surface area of the pan: " +
formatter.format(circlePan.surfaceArea()) + "cm^2");
        System.out.println("Volume of the pan: " +
formatter.format(circlePan.calcVolume()) + "cm^3");

        if(leastArea == 0){
            leastArea = circlePan.surfaceArea();
        }
    }
}

```

```

        type = "Circle";
    }
    else if(circlePan.surfaceArea() < leastArea){
        leastArea = circlePan.surfaceArea();
        type = "Circle";
    }

    if(mostVolume == 0){
        mostVolume = circlePan.calcVolume();
        type = "Circle";
    }
    else if(circlePan.calcVolume() > mostVolume){
        mostVolume = circlePan.calcVolume();
        type = "Circle";
    }
}

else if (userIn == 2){
    System.out.println("Input depth the depth of the pan: ");
    double depthIn = scan.nextDouble();

    while(depthIn <= 0){
        System.out.println("Invalid input. Please enter a number
greater than 0.");
        depthIn = scan.nextDouble();
    }

    System.out.println("Input the length of the base edge of the pan:
");
    double baseEdgeIn = scan.nextDouble();

    while(baseEdgeIn <= 0){
        System.out.println("Invalid input. Please enter a number
greater than 0.");
        baseEdgeIn = scan.nextDouble();
    }

    HexagonPan hexPan = new HexagonPan(baseEdgeIn, depthIn);
    System.out.println("Surface area of the pan: " +
formatter.format(hexPan.surfaceArea()) + "cm^2");
    System.out.println("Volume of the pan: " +
formatter.format(hexPan.volume()) + "cm^3");

    if(leastArea == 0){

```

```

        leastArea = hexPan.surfaceArea();
        type = "Hexagon";
    }
    else if(hexPan.surfaceArea() < leastArea){
        leastArea = hexPan.surfaceArea();
        type = "Hexagon";
    }

    if(mostVolume == 0){
        mostVolume = hexPan.volume();
        type = "Hexagon";
    }
    else if(hexPan.volume() > mostVolume){
        mostVolume = hexPan.volume();
        type = "Hexagon";
    }
}

else{
    System.out.println("Invalid input. Please input and accepted
number.");
}

    System.out.println("Select one of the following options: \n1 - Enter
information for a circle pan\n2 - Enter information for a hexagon pan\n3 -
Quit");

    System.out.println("Enter your choice: ");
    userIn = scan.nextInt();

}

    System.out.println("\nThe pan with the smallest surface area is a: " +
type + "\nSurface Area: " + formatter.format(leastArea) + "cm^2");
    System.out.println("The pan with the largest volume is a: " + type +
"\nVolume: " + formatter.format(mostVolume) + "cm^3");

}
}

```

## Section 2

Command Prompt

```
C:\Users\barym\Desktop\CS 1073\assign4>java PanDriver
Select one of the following options:
1 - Enter information for a circle pan
2 - Enter information for a hexagon pan
3 - Quit
Enter your choice:
1
Input depth of the pan (in cm):
10
Input the radius of the pan (in cm):
30
Surface area of the pan: 4,712.389cm^2
Volume of the pan: 28,274.334cm^3
Select one of the following options:
1 - Enter information for a circle pan
2 - Enter information for a hexagon pan
3 - Quit
Enter your choice:
2
Input depth the depth of the pan:
4
Input the length of the base edge of the pan:
5
Surface area of the pan: 184.952cm^2
Volume of the pan: 259.808cm^3
Select one of the following options:
1 - Enter information for a circle pan
2 - Enter information for a hexagon pan
3 - Quit
Enter your choice:
1
Input depth of the pan (in cm):
3
Input the radius of the pan (in cm):
3
Surface area of the pan: 84.823cm^2
Volume of the pan: 84.823cm^3
Select one of the following options:
1 - Enter information for a circle pan
2 - Enter information for a hexagon pan
3 - Quit
Enter your choice:
3
```



Enter your choice:

3

The pan with the smallest surface area is a: Circle

Surface Area:  $84.823\text{cm}^2$

The pan with the largest volume is a: Circle

Volume:  $28,274.334\text{cm}^3$

C:\Users\barym\Desktop\CS 1073\assign4>\_

## Section 3

```
/**
 * @author Ethan McCarthy 3573807
 */
import java.util.Scanner;

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

        System.out.println("Input a number between 1 and 99999:");
        int input = scan.nextInt();

        while(input < 1 || input > 99999){
            System.out.println("Invalid input. Please input a number within the
range.");
            input = scan.nextInt();
        }

        int x, mLowercase, mUppercase, hLowercase, hUppercase, fLowercase,
fUppercase, eLowercase, eUppercase, rLowercase, rUppercase;
        x = mLowercase = mUppercase = hLowercase = hUppercase = fLowercase =
fUppercase = eLowercase = eUppercase = rLowercase = rUppercase = 0;

        while (input > 0){
            if((input/59049) != 0){
                x = input/59049;
                input = input % 59049;
            }

            if((input/19683) != 0){
                mUppercase = input/19683;
                input = input % 19683;
            }

            if((input/6561) != 0 ){
                mLowercase = input/6561;
                input = input % 6561;
            }

            if((input/2187) != 0){
                hUppercase = input/2187;
                input = input % 2187;
            }
        }
    }
}
```

```
    if((input/729) != 0){
        hLowercase = input/729;
        input = input % 729;
    }

    if((input/243) != 0){
        fUppercase = input/243;
        input = input % 243;
    }

    if((input/81) != 0){
        fLowercase = input/81;
        input = input % 81;
    }

    if((input/27) != 0){
        eUppercase = input/27;
        input = input % 27;
    }

    if((input/9) != 0){
        eLowercase = input/9;
        input = input % 9;
    }

    if((input/3) != 0){
        rUppercase = input/3;
        input = input % 3;
    }

    if((input/1) != 0){
        rLowercase = input/1;
        input = input % 1;
    }

}

for (int i = 0; i < rLowercase; i++){
    System.out.print("r");
}

for (int i = 0; i < rUppercase; i++){
    System.out.print("R");
}
```

```
    for (int i = 0; i < eLowercase; i++){
        System.out.print("e");
    }

    for (int i = 0; i < eUppercase; i++){
        System.out.print("E");
    }

    for (int i = 0; i < fLowercase; i++){
        System.out.print("f");
    }

    for (int i = 0; i < fUppercase; i++){
        System.out.print("F");
    }

    for (int i = 0; i < hLowercase; i++){
        System.out.print("h");
    }

    for (int i = 0; i < hUppercase; i++){
        System.out.print("H");
    }

    for (int i = 0; i < mLowercase; i++){
        System.out.print("m");
    }


    for (int i = 0; i < mUppercase; i++){
        System.out.print("M");
    }

    for (int i = 0; i < x; i++){
        System.out.print("X");
    }

}
}
```

## Section 4

```
C:\Users\barym\Desktop\CS 1073\assign4>java NumberSystem
Input a number between 1 and 99999:
100000
Invalid input. Please input a number within the range.
-50
Invalid input. Please input a number within the range.
-1000
Invalid input. Please input a number within the range.
47560
rReffhmmMM
C:\Users\barym\Desktop\CS 1073\assign4>_
```

 Command Prompt

```
C:\Users\barym\Desktop\CS 1073\assign4>java NumberSystem
Input a number between 1 and 99999:
99999
eeEfhhMMX
C:\Users\barym\Desktop\CS 1073\assign4>java NumberSystem
Input a number between 1 and 99999:
1000000
Invalid input. Please input a number within the range.
-1312321
Invalid input. Please input a number within the range.
-400
Invalid input. Please input a number within the range.
400
rReeEEfF
C:\Users\barym\Desktop\CS 1073\assign4>_
```