

C-DAC Mumbai

Lab Assignment

Question 1: Print Numbers from 1 to N

Problem Statement:

Write a Java program that asks the user for a number N and then prints the numbers from 1 to N using a for loop.

Sample Input:

Enter a number: 10

Expected Output:

1 2 3 4 5 6 7 8 9 10

The screenshot shows an IDE with a Java file named 'Assign4.java'. The code is as follows:

```
1 import java.util.Scanner;
2
3 public class Assign4 {
4     public static void main (String[] args) {
5         Scanner sc = new Scanner (System.in);
6         System.out.print("enter a number");
7         int N = sc.nextInt();
8
9         for (int i =1; i <=N; i++){
10             System.out.print(i + " ");
11         }
12     }
13 }
14
15
```

The Java Console shows the following output:

```
>>> INFO: Compiling File "Assign4.java"...
C:\Users\PC\OneDrive\Documents\Assign4.java:7: error: cannot find symbol
    int N = sc.nextInt();
                ^
symbol:   method nextInt()
location: variable sc of type Scanner
1 error
>>> ERROR: Failed to compile file "Assign4.java", exit code = 1
>>> INFO: Compiling File "Assign4.java"...
>>> SUCCESS: File "Assign4.java" compiled successfully.
```

The command prompt shows the following commands and output:

```
C:\Users\PC\OneDrive\Documents>javac Assign4.java
Assign4.java:5: error: cannot find symbol
    Scanner sc = new Scanner (System.
    ^
symbol:   class Scanner
location: class printnum
4 errors
C:\Users\PC\OneDrive\Documents>java Assign
Error: Could not find or load main class Assign
Caused by: java.lang.ClassNotFoundException: Assign
C:\Users\PC\OneDrive\Documents>java Assign4
enter a number6
1 2 3 4 5 6
C:\Users\PC\OneDrive\Documents>
```

Question 2: Print Multiples of 3 between 1 and N

Problem Statement:

Write a Java program that asks the user for a number N and prints all the multiples of 3 between 1 and N using a for loop.

Sample Input:

Enter a number: 20

Expected Output:

3 6 9 12

The screenshot shows an IDE with a Java file named 'Assign4.java'. The code is as follows:

```
15 public class Assign4 {
16     public static void main(String[] args){
17         Scanner sc = new Scanner(System.in);
18         System.out.println("enter a number");
19         int N = sc.nextInt();
20         for (int i =3; i <= N; i +=3) {
21             System.out.print(i + " ");
22         }
23     }
24 }
25
26
```

The command prompt shows the following commands and output:

```
C:\Users\PC\OneDrive\Documents>javac Assign4.java
Assign4.java:5: error: ';' expected
    Scanner sc = new Scanner (System.in);
    ^
1 error
C:\Users\PC\OneDrive\Documents>java Assign
Error: Could not find or load main class Assign
Caused by: java.lang.ClassNotFoundException: Assign
C:\Users\PC\OneDrive\Documents>java Assign4
enter a number
6
3 6
C:\Users\PC\OneDrive\Documents>java Assign4
enter a number
100
3 6 9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66
69 72 75 78 81 84 87 90 93 96 99
C:\Users\PC\OneDrive\Documents>
```

Question 3: Calculate the Factorial of a Number

Problem Statement:

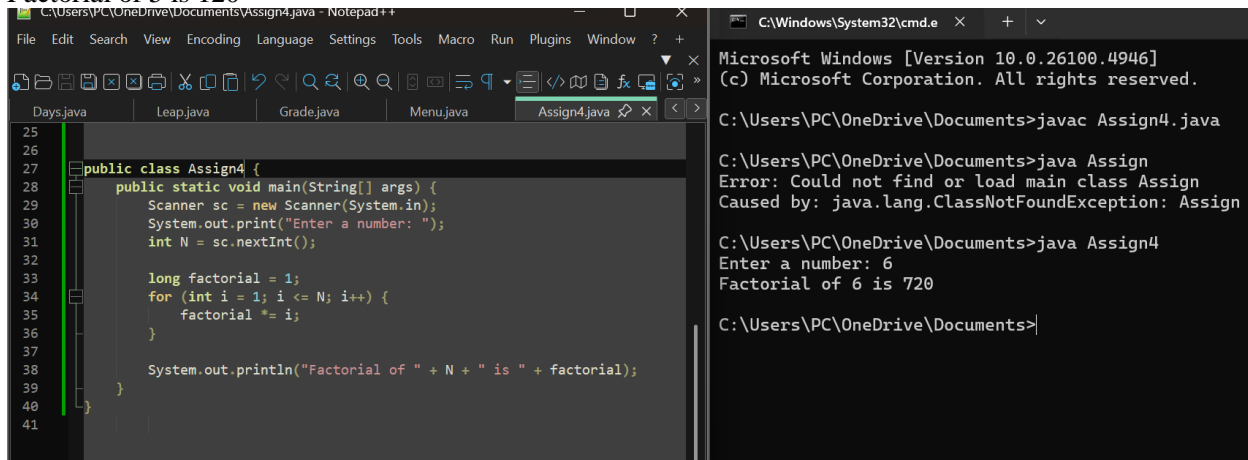
Write a Java program that asks the user for a number N and calculates the factorial of N using a for loop.

Sample Input:

Enter a number: 5

Expected Output:

Factorial of 5 is 120



The screenshot shows a Java IDE with a file named `Assign4.java` containing the following code:

```
25
26
27 public class Assign4 {
28     public static void main(String[] args) {
29         Scanner sc = new Scanner(System.in);
30         System.out.print("Enter a number: ");
31         int N = sc.nextInt();
32
33         long factorial = 1;
34         for (int i = 1; i <= N; i++) {
35             factorial *= i;
36         }
37
38         System.out.println("Factorial of " + N + " is " + factorial);
39     }
40 }
41
```

The command prompt shows the following commands and output:

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.26100.4946]
(c) Microsoft Corporation. All rights reserved.

C:\Users\PC\OneDrive\Documents>javac Assign4.java

C:\Users\PC\OneDrive\Documents>java Assign
Error: Could not find or load main class Assign
Caused by: java.lang.ClassNotFoundException: Assign

C:\Users\PC\OneDrive\Documents>java Assign4
Enter a number: 6
Factorial of 6 is 720

C:\Users\PC\OneDrive\Documents>
```

Question 4: Print Even Numbers from 1 to N

Problem Statement:

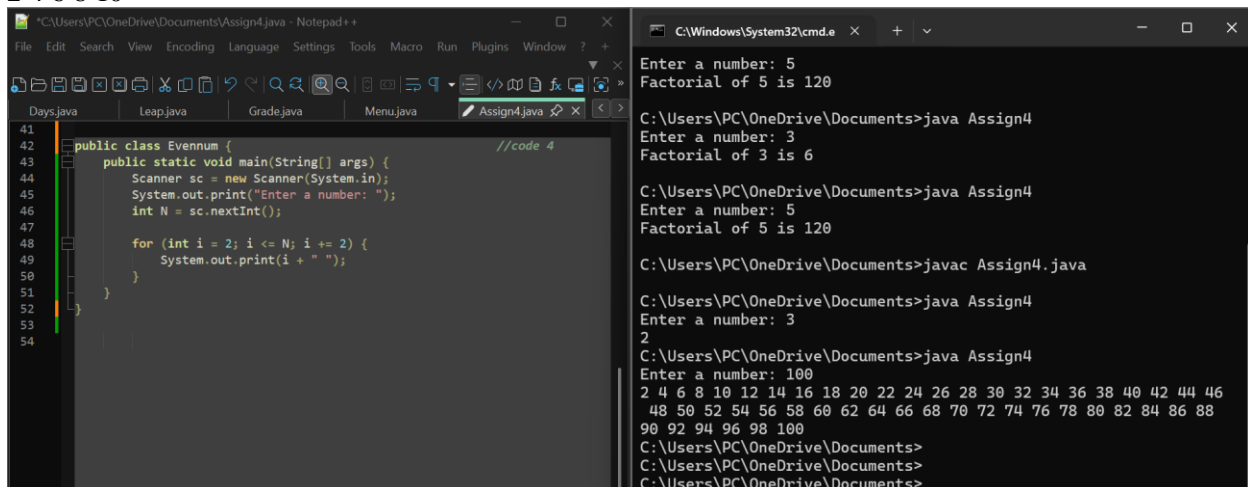
Write a Java program that asks the user for a number N and prints all the even numbers from 1 to N using a for loop.

Sample Input:

Enter a number: 10

Expected Output:

2 4 6 8 10



The screenshot shows a Java IDE with a file named `Assign4.java` containing the following code:

```
41
42
43 public class Evennum {
44     public static void main(String[] args) {
45         Scanner sc = new Scanner(System.in);
46         System.out.print("Enter a number: ");
47         int N = sc.nextInt();
48
49         for (int i = 2; i <= N; i += 2) {
50             System.out.print(i + " ");
51         }
52     }
53 }
54
```

The command prompt shows the following commands and output:

```
C:\Windows\System32\cmd.exe
Enter a number: 5
Factorial of 5 is 120

C:\Users\PC\OneDrive\Documents>java Assign4
Enter a number: 3
Factorial of 3 is 6

C:\Users\PC\OneDrive\Documents>java Assign4
Enter a number: 5
Factorial of 5 is 120

C:\Users\PC\OneDrive\Documents>javac Assign4.java

C:\Users\PC\OneDrive\Documents>java Assign4
Enter a number: 3
2

C:\Users\PC\OneDrive\Documents>java Assign4
Enter a number: 100
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46
48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88
90 92 94 96 98 100

C:\Users\PC\OneDrive\Documents>
C:\Users\PC\OneDrive\Documents>
C:\Users\PC\OneDrive\Documents>
```

Question 5: Sum of Odd Numbers between 1 and N

Problem Statement:

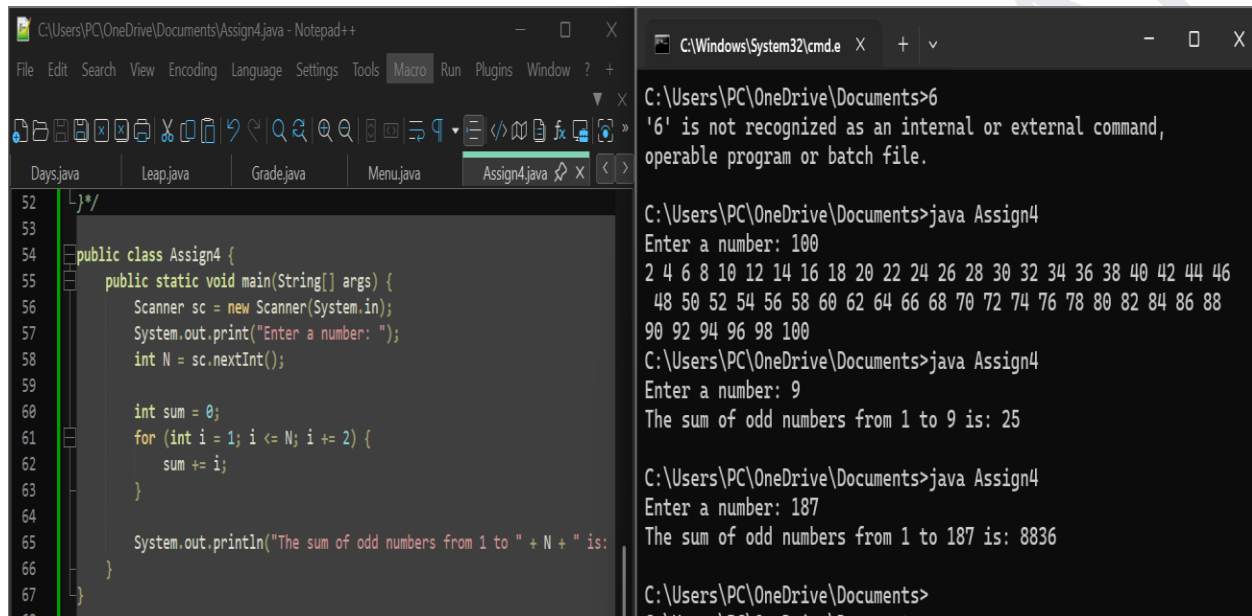
Write a Java program that asks the user for a number N and calculates the sum of all odd numbers between 1 and N using a for loop.

Sample Input:

Enter a number: 10

Expected Output:

The sum of odd numbers from 1 to 10 is: 25



The screenshot shows a Notepad++ window with the following Java code for Assign4.java:

```
52  }  
53  */  
54  public class Assign4 {  
55      public static void main(String[] args) {  
56          Scanner sc = new Scanner(System.in);  
57          System.out.print("Enter a number: ");  
58          int N = sc.nextInt();  
59  
60          int sum = 0;  
61          for (int i = 1; i <= N; i += 2) {  
62              sum += i;  
63          }  
64  
65          System.out.println("The sum of odd numbers from 1 to " + N + " is:  
66      }  
67  }
```

The Command Prompt shows the following execution steps:

```
C:\Users\PC\OneDrive\Documents>6  
'6' is not recognized as an internal or external command,  
operable program or batch file.  
  
C:\Users\PC\OneDrive\Documents>java Assign4  
Enter a number: 100  
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46  
48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88  
90 92 94 96 98 100  
C:\Users\PC\OneDrive\Documents>java Assign4  
Enter a number: 9  
The sum of odd numbers from 1 to 9 is: 25  
  
C:\Users\PC\OneDrive\Documents>java Assign4  
Enter a number: 187  
The sum of odd numbers from 1 to 187 is: 8836  
  
C:\Users\PC\OneDrive\Documents>
```

Question 6: Print All Elements of an Array

Problem Statement:

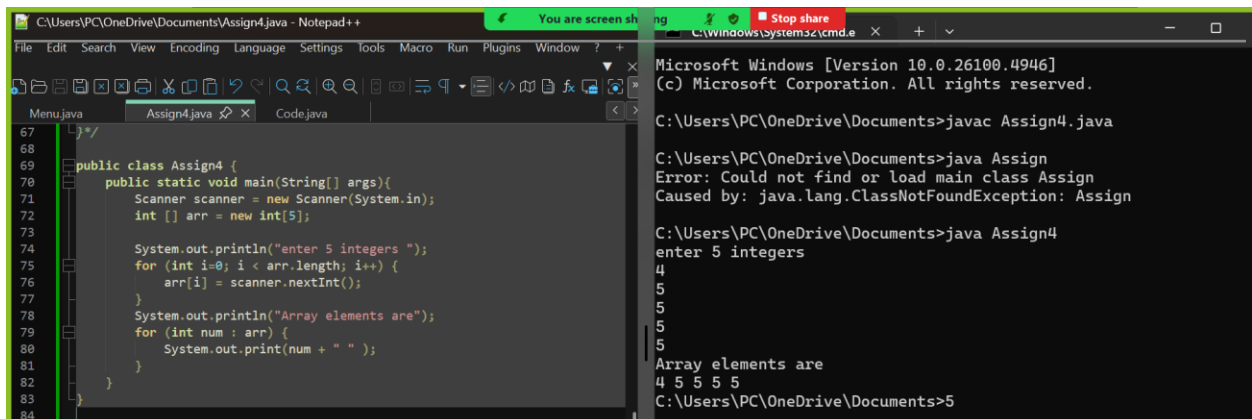
Write a Java program that uses a **for-each** loop to print all elements of an integer array. The program should ask the user to input 5 integers, store them in an array, and then print all the elements using a **for-each** loop.

Sample Input:

Enter 5 integers: 3 7 12 5 8

Expected Output:

3 7 12 5 8



The screenshot shows a Notepad++ window with the following Java code for Assign4.java:

```
67  }  
68  */  
69  public class Assign4 {  
70      public static void main(String[] args){  
71          Scanner scanner = new Scanner(System.in);  
72          int [] arr = new int[5];  
73  
74          System.out.println("enter 5 integers ");  
75          for (int i=0; i < arr.length; i++) {  
76              arr[i] = scanner.nextInt();  
77          }  
78          System.out.println("Array elements are");  
79          for (int num : arr) {  
80              System.out.print(num + " ");  
81          }  
82      }  
83  }
```

The Command Prompt shows the following execution steps:

```
Microsoft Windows [Version 10.0.26100.4946]  
(c) Microsoft Corporation. All rights reserved.  
  
C:\Users\PC\OneDrive\Documents>javac Assign4.java  
  
C:\Users\PC\OneDrive\Documents>java Assign  
Error: Could not find or load main class Assign  
Caused by: java.lang.ClassNotFoundException: Assign  
  
C:\Users\PC\OneDrive\Documents>java Assign4  
enter 5 integers  
4  
5  
5  
5  
5  
Array elements are  
4 5 5 5 5  
C:\Users\PC\OneDrive\Documents>
```

Question 7: Find the Sum of All Elements in an Array

Problem Statement:

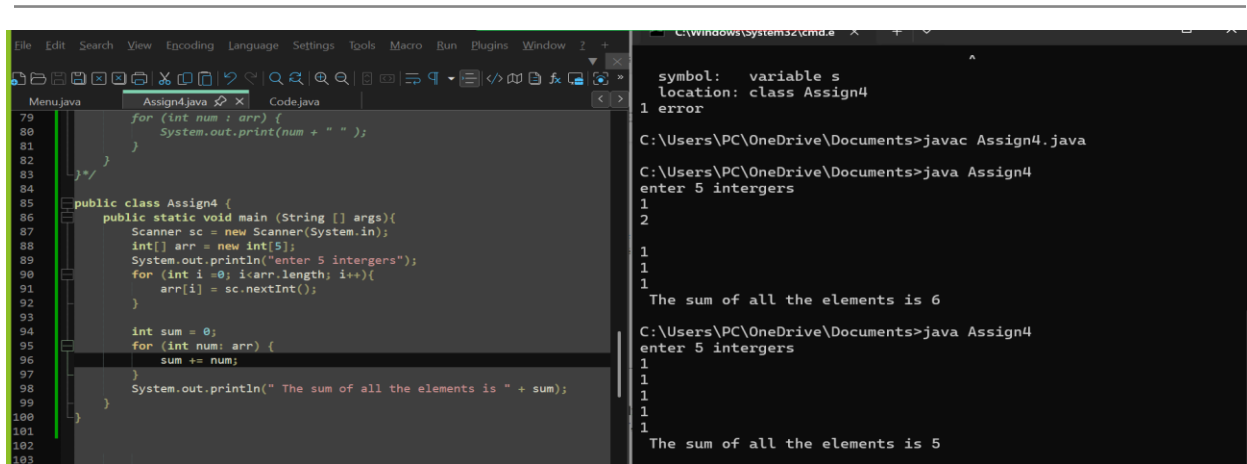
Write a Java program that uses a **for-each** loop to calculate the sum of all elements in a given integer array. The program should ask the user to input 5 integers, store them in an array, and then compute the sum of these numbers using the **for-each** loop.

Sample Input:

Enter 5 integers: 4 6 8 2 10

Expected Output:

The sum of all numbers is: 30



```
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ? +
Menu.java Assign4.java Code.java
79 for (int num : arr) {
80     System.out.print(num + " ");
81 }
82 }
83 }
84 }
85 public class Assign4 {
86     public static void main (String [] args){
87         Scanner sc = new Scanner(System.in);
88         int[] arr = new int[5];
89         System.out.println("enter 5 intergers");
90         for (int i =0; i<arr.length; i++){
91             arr[i] = sc.nextInt();
92         }
93
94         int sum = 0;
95         for (int num: arr) {
96             sum += num;
97         }
98         System.out.println(" The sum of all the elements is " + sum);
99     }
100 }
101
102
103

symbol:   variable s
location: class Assign4
1 error

C:\Users\PC\OneDrive\Documents>javac Assign4.java

C:\Users\PC\OneDrive\Documents>java Assign4
enter 5 intergers
1
2
1
1
1
The sum of all the elements is 6

C:\Users\PC\OneDrive\Documents>java Assign4
enter 5 intergers
1
1
1
1
1
The sum of all the elements is 5
```

Question 8: Print All Names in a String Array

Problem Statement:

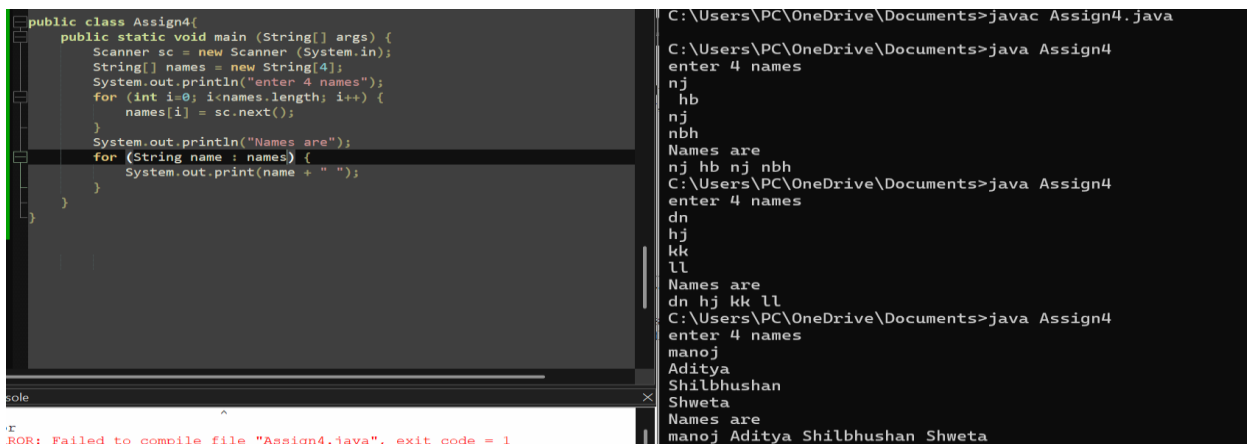
Write a Java program that uses a **for-each** loop to print all the names stored in a String array. The program should ask the user to input 4 names, store them in an array, and then print each name using the **for-each** loop.

Sample Input:

Enter 4 names: Manoj Aditya Shilbhushan Shweta

Expected Output:

Manoj
Aditya
Shilbhushan
Shweta



```
public class Assign4{
    public static void main (String[] args) {
        Scanner sc = new Scanner (System.in);
        String[] names = new String[4];
        System.out.println("enter 4 names");
        for (int i=0; i<names.length; i++) {
            names[i] = sc.next();
        }
        System.out.println("Names are");
        for (String name : names) {
            System.out.print(name + " ");
        }
    }
}

C:\Users\PC\OneDrive\Documents>javac Assign4.java

C:\Users\PC\OneDrive\Documents>java Assign4
enter 4 names
nj
hb
nj
nbh
Names are
nj hb nj nbh
C:\Users\PC\OneDrive\Documents>java Assign4
enter 4 names
dn
hj
kk
ll
Names are
dn hj kk ll
C:\Users\PC\OneDrive\Documents>java Assign4
enter 4 names
manoj
aditya
shilbhushan
shweta
Names are
manoj aditya shilbhushan shweta
```

Question 9: Find the Largest Element in an Array

Problem Statement:

Write a Java program that asks the user to input 5 integers, stores them in an array, and then finds and prints the largest element in the array. (Explore in-built method to solve this)

Sample Input:

Enter 5 integers: 12 45 67 23 89

Expected Output:

The largest element is: 89

```
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
Menu.java Assign4.java Code.java
115 //
116
117 public class Assign4 {
118     public static void main (String[] args) {
119         Scanner sc = new Scanner(System.in);
120         int [] arr = new int[5];
121
122         System.out.println("enter 5 intergers ");
123         for (int i =0; i < arr.length; i++){
124             arr[i] = sc.nextInt();
125         }
126
127         int max = Arrays.stream(arr).max().getAsInt();
128         System.out.println("The largest element is " + max);
129     }
130 }
131
132
133

Names are
manoj Aditya Shilbhushan Shweta
C:\Users\PC\OneDrive\Documents>javac Assign4.java
Assign4.java:123: error: cannot find symbol
        for (int i =0; i < arr.length; i++){
                               ^
    symbol:   variable length
    location: variable arr of type int[]
Assign4.java:127: error: cannot find symbol
        int max =Arrays.stream(arr).max().getAsInt();
                                   ^
    symbol:   variable Arrays
    location: class Assign4
2 errors

C:\Users\PC\OneDrive\Documents>javac Assign4.java
Assign4.java:127: error: cannot find symbol
        int max = Arrays.stream(arr).max().getAsInt();
                                   ^
    symbol:   variable Arrays
    location: class Assign4
1 error

C:\Users\PC\OneDrive\Documents>javac Assign4.java
Assign4.java:127: error: cannot find symbol
        int max = Arrays.stream(arr).max().getAsInt();
                                   ^
    symbol:   variable Arrays
    location: class Assign4
1 error
```

Question 10: Find the Average of Elements in an Array

Problem Statement:

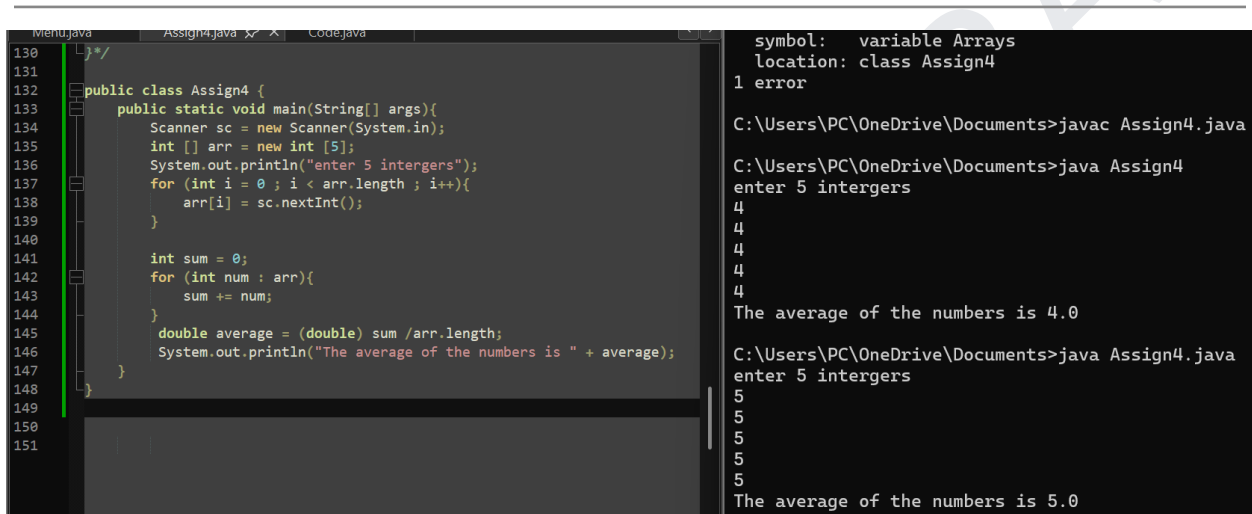
Write a Java program that asks the user to input 5 integers, stores them in an array, and then calculates and prints the average of the elements in the array.

Sample Input:

Enter 5 integers: 10 20 30 40 50

Expected Output:

The average of the numbers is: 30.0



```
130 131 132 public class Assign4 {
133     public static void main(String[] args){
134         Scanner sc = new Scanner(System.in);
135         int [] arr = new int [5];
136         System.out.println("enter 5 integers");
137         for (int i = 0 ; i < arr.length ; i++){
138             arr[i] = sc.nextInt();
139         }
140
141         int sum = 0;
142         for (int num : arr){
143             sum += num;
144         }
145         double average = (double) sum /arr.length;
146         System.out.println("The average of the numbers is " + average);
147     }
148 }
149
150
151
```

symbol: variable Arrays
location: class Assign4
1 error

C:\Users\PC\OneDrive\Documents>javac Assign4.java

C:\Users\PC\OneDrive\Documents>java Assign4
enter 5 integers
4
4
4
4
4
The average of the numbers is 4.0

C:\Users\PC\OneDrive\Documents>java Assign4.java
enter 5 integers
5
5
5
5
5
The average of the numbers is 5.0

Question 11: Count Positive and Negative Numbers in an Array

Problem Statement:

Write a Java program that asks the user to input 6 integers, stores them in an array, and then counts how many positive and negative numbers are present in the array.

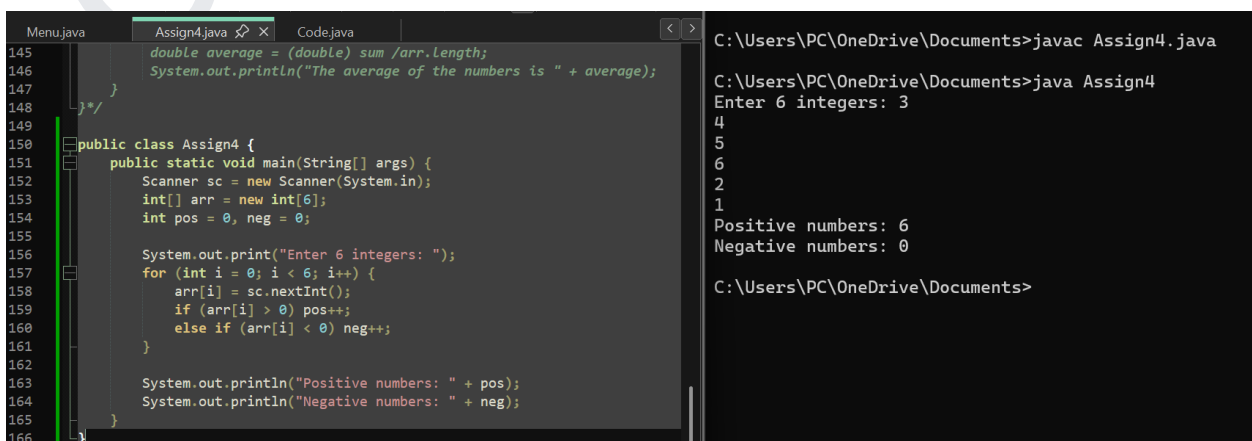
Sample Input:

Enter 6 integers: -5 3 7 -2 0 8

Expected Output:

Positive numbers: 3

Negative numbers: 2



```
145 double average = (double) sum /arr.Length;
146 System.out.println("The average of the numbers is " + average);
147 }
148 */
149
150 public class Assign4 {
151     public static void main(String[] args) {
152         Scanner sc = new Scanner(System.in);
153         int[] arr = new int[6];
154         int pos = 0, neg = 0;
155
156         System.out.print("Enter 6 integers: ");
157         for (int i = 0; i < 6; i++) {
158             arr[i] = sc.nextInt();
159             if (arr[i] > 0) pos++;
160             else if (arr[i] < 0) neg++;
161         }
162
163         System.out.println("Positive numbers: " + pos);
164         System.out.println("Negative numbers: " + neg);
165     }
166 }
```

C:\Users\PC\OneDrive\Documents>javac Assign4.java

C:\Users\PC\OneDrive\Documents>java Assign4
Enter 6 integers: 3
4
5
6
2
1
Positive numbers: 6
Negative numbers: 0

C:\Users\PC\OneDrive\Documents>

Question 12: Sort an Array in Ascending Order

Problem Statement:

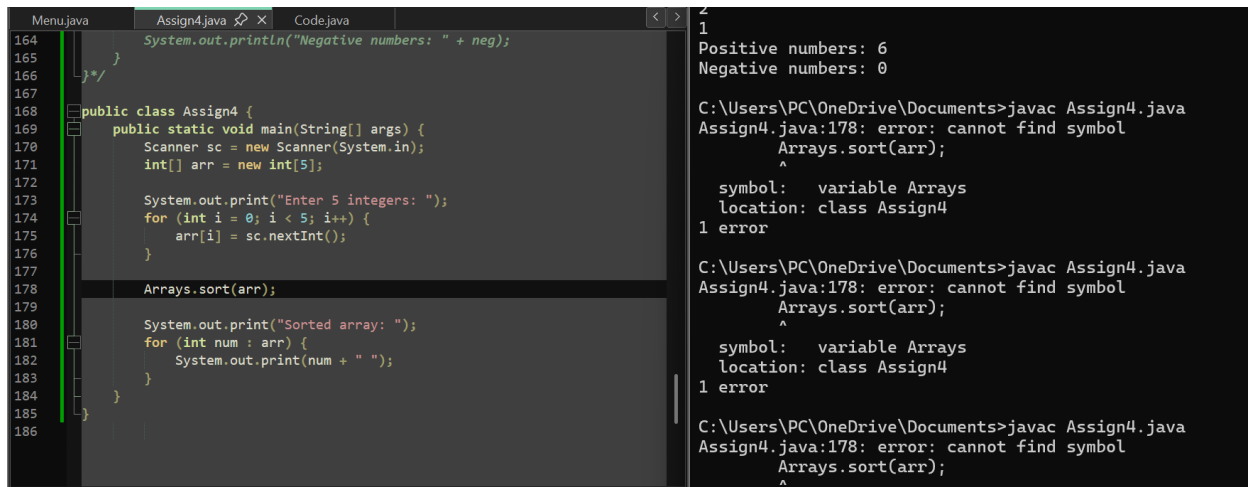
Write a Java program that asks the user to input 5 integers, stores them in an array, and then sorts the array in ascending order using the `Arrays.sort()` method. After sorting, print the sorted array.

Sample Input:

Enter 5 integers: 12 45 23 8 90

Expected Output:

Sorted array: 8 12 23 45 90



```
Menu.java Assign4.java Code.java
164 System.out.println("Negative numbers: " + neg);
165 }
166 }
167
168 public class Assign4 {
169     public static void main(String[] args) {
170         Scanner sc = new Scanner(System.in);
171         int[] arr = new int[5];
172
173         System.out.print("Enter 5 integers: ");
174         for (int i = 0; i < 5; i++) {
175             arr[i] = sc.nextInt();
176         }
177
178         Arrays.sort(arr);
179
180         System.out.print("Sorted array: ");
181         for (int num : arr) {
182             System.out.print(num + " ");
183         }
184     }
185 }
186
```

```
2
1
Positive numbers: 6
Negative numbers: 0

C:\Users\PC\OneDrive\Documents>javac Assign4.java
Assign4.java:178: error: cannot find symbol
    Arrays.sort(arr);
    ^
symbol:   variable Arrays
location: class Assign4
1 error

C:\Users\PC\OneDrive\Documents>javac Assign4.java
Assign4.java:178: error: cannot find symbol
    Arrays.sort(arr);
    ^
symbol:   variable Arrays
location: class Assign4
1 error

C:\Users\PC\OneDrive\Documents>javac Assign4.java
Assign4.java:178: error: cannot find symbol
    Arrays.sort(arr);
    ^
1 error
```

Question 13: Check if an Array Contains a Specific Element

Problem Statement:

Write a Java program that asks the user to input 5 integers, stores them in an array, and then checks whether a specific number (input by the user) is present in the array using the `Arrays.asList()` method. If the number is found, print "Found", otherwise print "Not Found".

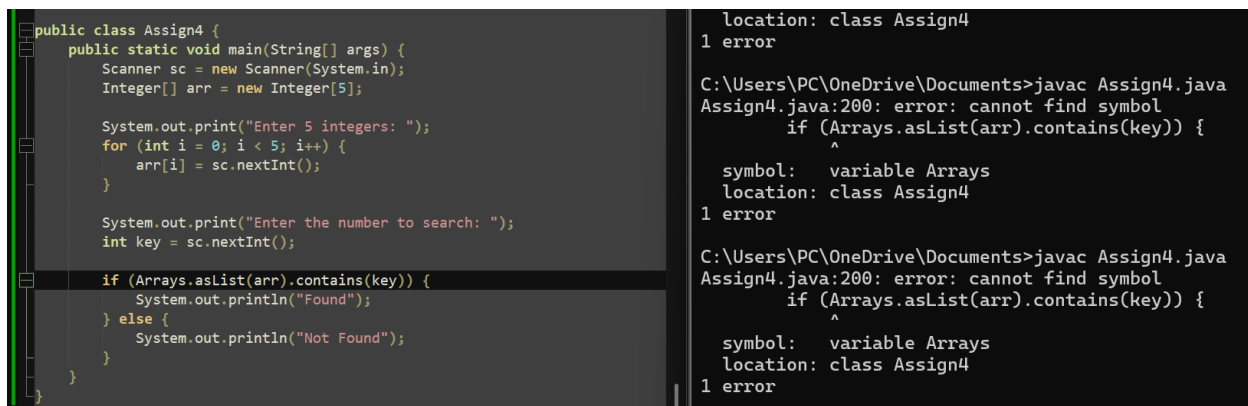
Sample Input:

Enter 5 integers: 10 20 30 40 50

Enter the number to search: 30

Expected Output:

Found



```
public class Assign4 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        Integer[] arr = new Integer[5];

        System.out.print("Enter 5 integers: ");
        for (int i = 0; i < 5; i++) {
            arr[i] = sc.nextInt();
        }

        System.out.print("Enter the number to search: ");
        int key = sc.nextInt();

        if (Arrays.asList(arr).contains(key)) {
            System.out.println("Found");
        } else {
            System.out.println("Not Found");
        }
    }
}
```

```
location: class Assign4
1 error

C:\Users\PC\OneDrive\Documents>javac Assign4.java
Assign4.java:200: error: cannot find symbol
        if (Arrays.asList(arr).contains(key)) {
            ^
symbol:   variable Arrays
location: class Assign4
1 error

C:\Users\PC\OneDrive\Documents>javac Assign4.java
Assign4.java:200: error: cannot find symbol
        if (Arrays.asList(arr).contains(key)) {
            ^
symbol:   variable Arrays
location: class Assign4
1 error
```

Question 14: Find the Index of an Element in an Array

Problem Statement:

Write a Java program that asks the user to input 5 integers, stores them in an array, and then finds the index of a specific number (input by the user) using the `Arrays.binarySearch()` method. If the number is found, print the index, otherwise print "Not Found".

Sample Input:

Enter 5 integers: 5 10 15 20 25

Enter the number to search: 15

Expected Output:

The number 15 is found at index 2

```
import java.util.Arrays;
public class Assign4 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int[] arr = new int[5];

        System.out.print("Enter 5 integers: ");
        for (int i = 0; i < 5; i++) {
            arr[i] = sc.nextInt();
        }

        Arrays.sort(arr); // binarySearch requires sorted array

        System.out.print("Enter the number to search: ");
        int key = sc.nextInt();

        int index = Arrays.binarySearch(arr, key);

        if (index >= 0) {
            System.out.println("The number " + key + " is found at index " + index);
        } else {
            System.out.println("Not Found");
        }
    }
}
```

```
2
Enter the number to search: 4
Not Found

C:\Users\PC\OneDrive\Documents>java Assign4
Enter 5 integers:
1
1
1
1
1

1
Enter the number to search: 2
Not Found

C:\Users\PC\OneDrive\Documents>java Assign4
Enter 5 integers:
1
2
3
4
5
Enter the number to search: 2
The number 2 is found at index 1
```

on: class Assign4
OR: Failed to compile file "Assign4.java". exit code = 1

Question 15: Write a program to print the following pattern:

```
1
2*2
3*3*3
4*4*4*4
5*5*5*5*5
5*5*5*5*5
4*4*4*4
3*3*3
2*2
```

```
public class Assign4 { //code 15
    public static void main(String[] args) {
        int n = 5;

        // Increasing part
        for (int i = 1; i <= n; i++) {
            for (int j = 1; j <= i; j++) {
                System.out.print(i);
                if (j < i) System.out.print("*");
            }
            System.out.println();
        }

        // Decreasing part
        for (int i = n; i >= 2; i--) {
            for (int j = 1; j <= i; j++) {
                System.out.print(i);
                if (j < i) System.out.print("*");
            }
            System.out.println();
        }
    }
}
```

```
4*4*4*4
3*3*3
2*2

C:\Users\PC\OneDrive\Documents>java Assign4
1
2*2
3*3*3
4*4*4*4
5*5*5*5*5
5*5*5*5*5
4*4*4*4
3*3*3
2*2

C:\Users\PC\OneDrive\Documents>java Assign4
1
2*2
3*3*3
4*4*4*4
5*5*5*5*5
5*5*5*5*5
4*4*4*4
3*3*3
2*2
```

le
OR: Failed to compile file "Assign4.java", exit code = 1
O: Compiling File "Assign4.java"...

Question 16: Write a program to print the following pattern:

```
1
1*2
1*2*3
1*2*3*4
1*2*3*4*5
```

```
public class Assign4 {
    public static void main(String[] args) {
        int n = 5;

        for (int i = 1; i <= n; i++) {
            for (int j = 1; j <= i; j++) {
                System.out.print(j);
                if (j < i) {
                    System.out.print("*");
                }
            }
            System.out.println();
        }
    }
}
```

```
C:\Users\PC\OneDrive\Documents>java Assign4
1
1*2
1*2*3
1*2*3*4
1*2*3*4*5

C:\Users\PC\OneDrive\Documents>java Assign4
```

Question 17: Write a program to print the following pattern:

```
1
1*3
1*3*5
1*3*5*7
1*3*5*7*9
```

```
public class Assign4 {
    public static void main(String[] args) {
        int n = 5; // number of rows

        for (int i = 1; i <= n; i++) {
            int num = 1;
            for (int j = 1; j <= i; j++) {
                System.out.print(num);
                if (j < i) {
                    System.out.print("*");
                }
                num += 2; // move to next odd number
            }
            System.out.println();
        }
    }
}
```

```
1
1*3
1*3*5
1*3*5*7
1*3*5*7*9

C:\Users\PC\OneDrive\Documents>java Assign4
1
1*3
1*3*5
1*3*5*7
1*3*5*7*9

C:\Users\PC\OneDrive\Documents>java Assign4
1
1*3
1*3*5
1*3*5*7
1*3*5*7*9
```

Question 18: Write a program to print the following pattern:

```
11111
22222
33333
44444
55555
```

```
public class Assign4 { //code18
    public static void main(String[] args) {
        int n = 5; // number of rows and columns

        for (int i = 1; i <= n; i++) {
            for (int j = 1; j <= n; j++) {
                System.out.print(i);
            }
            System.out.println();
        }
    }
}
```

```
C:\Users\PC\OneDrive\Documents>java Assign4
44444
55555
C:\Users\PC\OneDrive\Documents>
```

Question 19: Write a program to print the following pattern:

```
1
22
333
4444
55555
```

```
public class Assign4 { //code19
    public static void main(String[] args) {
        int n = 5; // number of rows

        for (int i = 1; i <= n; i++) {
            for (int j = 1; j <= i; j++) {
                System.out.print(i);
            }
            System.out.println();
        }
    }
}
```

```
C:\Users\PC\OneDrive\Documents>java Assign4
1
22
333
4444
55555
C:\Users\PC\OneDrive\Documents>java Assign4
1
22
333
4444
55555
```

Question 20: Write a program to print the following pattern:

```
1
12
123
1234
12345
```

```

public class IncreasingTrianglePattern {
    public static void main(String[] args) {
        int n = 5; // number of rows

        for (int i = 1; i <= n; i++) {
            for (int j = 1; j <= i; j++) {
                System.out.print(j);
            }
            System.out.println();
        }
    }
}

```

Question 21: Write a program to print the following pattern:

```

1
2 3
4 5 6
7 8 9 10
11 12 13 14 15

```

```

public class ContinuousNumberTriangle {
    public static void main(String[] args) {
        int n = 5; // number of rows
        int num = 1;

        for (int i = 1; i <= n; i++) {
            for (int j = 1; j <= i; j++) {
                System.out.print(num + " ");
                num++;
            }
            System.out.println();
        }
    }
}

```

Question 22: Write a program to print the following pattern:

```

*****
*   *
*   *
*   *
*   *
*****

```

```

public class DPattern {                                     //code22
    public static void main(String[] args) {
        int height = 7; // total rows
        int width = 6;  // total columns

        for (int i = 0; i < height; i++) {
            for (int j = 0; j < width; j++) {
                if (i == 0 || i == height - 1) {
                    System.out.print("*");
                }
                else if (j == 0) {
                    System.out.print("*");
                }
                else if (j == width - 1 && i != 0 && i != height - 1) {
                    System.out.print("*");
                }
                else {
                    System.out.print(" ");
                }
            }
            System.out.println();
        }
    }
}

```

Question 23: Write a program to print the following pattern:

```

public class DiamondPattern {                             //code23
    public static void main(String[] args) {
        int n = 5; // height of upper half (you can change it)

        for (int i = 1; i <= n; i++) {
            for (int j = i; j < n; j++) {
                System.out.print(" ");
            }
            for (int j = 1; j <= (2 * i - 1); j++) {
                System.out.print("*");
            }
            System.out.println();
        }

        for (int i = n - 1; i >= 1; i--) {
            for (int j = n; j > i; j--) {
                System.out.print(" ");
            }
            for (int j = 1; j <= (2 * i - 1); j++) {
                System.out.print("*");
            }
            System.out.println();
        }
    }
}

```

```

      *
     ***
    *****
   *********
  ***********
 *****
*****
 *****
  *****
   ***
    *

```

Question 24: Reverse a String

Problem Statement:

Write a Java program that asks the user for a string and then prints the reverse of that string.

Sample Input:

Enter a string: hello

Expected Output:

Reversed string: olleh

```
public class ReverseString {                                     //code24
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a string: ");
        String str = sc.nextLine();
        String reversed = "";
        for (int i = str.length() - 1; i >= 0; i--) {
            reversed += str.charAt(i);
        }
        System.out.println("Reversed string: " + reversed);
        sc.close();
    }
}
```

Question 25: Count Vowels in a String

Problem Statement:

Write a Java program that asks the user for a string and counts the number of vowels (a, e, i, o, u) in the string. The program should then print the total number of vowels.

Sample Input:

Enter a string: programming

Expected Output:

The number of vowels in 'programming' is: 3

```
public class CountVowels {                                     //code25
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a string: ");
        String str = sc.nextLine();
        int count = 0;
        str = str.toLowerCase(); // convert to lowercase for easy comparison
        for (int i = 0; i < str.length(); i++) {
            char ch = str.charAt(i);
            if (ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u') {
                count++;
            }
        }
        System.out.println("The number of vowels in '" + str + "' is: " + count);
        sc.close();
    }
}
```

Question 26: Check if a String is a Palindrome

Problem Statement:

Write a Java program that asks the user for a string and checks whether the string is a palindrome. A palindrome is a string that reads the same backward as forward (ignoring spaces and punctuation).

Sample Input:

Enter a string: madam

Expected Output:

The string 'madam' is a palindrome.

```
//code26
public class PalindromeCheck {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a string: ");
        String str = sc.nextLine();
        String cleanStr = str.toLowerCase().replaceAll("[^a-z0-9]", "");
        String reversed = new StringBuilder(cleanStr).reverse().toString();
        if (cleanStr.equals(reversed)) {
            System.out.println("The string '" + str + "' is a palindrome.");
        } else {
            System.out.println("The string '" + str + "' is not a palindrome.");
        }
        sc.close();
    }
}
```

Question 27: String Literal and Object Creation

Problem Statement:

Write a Java program that creates two string variables using string literals with the same content. Then, print whether both variables point to the same object.

Code Example:

```
String str1 = "hello";
```

```
String str2 = "hello";
```

Expected Output:

Both variables point to the same object: true

```
//code27
public class StringLiteralExample {
    public static void main(String[] args) {
        String str1 = "hello";
        String str2 = "hello";
        boolean result = (str1 == str2);

        System.out.println("Both variables point to the same object: " + result);
    }
}
```

Question 28: String Creation with new Keyword

Problem Statement:

Write a Java program that creates two string objects using the new keyword with the same content. Then, print whether both objects are the same using the == operator and the .equals() method.

Code Example:

```
String str1 = new String("hello");  
String str2 = new String("hello");
```

Expected Output:

Using == : false

Using .equals(): true

```
public class StringObjectExample { //code28  
    public static void main(String[] args) {  
        String str1 = new String("hello");  
        String str2 = new String("hello");  
        System.out.println("Using == : " + (str1 == str2));  
        System.out.println("Using .equals(): " + str1.equals(str2));  
    }  
}
```

Question 29: String Concatenation and Object Creation

Problem Statement:

Write a Java program that concatenates two strings using the + operator. Print whether the concatenated string is a new object or a reference to an existing string object using the == operator.

Code Example:

```
String str1 = "hello";  
String str2 = "world";  
String str3 = str1 + str2;
```

Expected Output:

Is str3 pointing to the same object as str1? false

```
public class StringConcatenationExample { //code29  
    public static void main(String[] args) {  
        String str1 = "hello";  
        String str2 = "world";  
        String str3 = str1 + str2;  
        System.out.println("Is str3 pointing to the same object as str1? " + (str3 == str1));  
        System.out.println("Concatenated String (str3): " + str3);  
    }  
}
```

Question 30: String Pool with intern() Method

Problem Statement:

Write a Java program that creates a string using the new keyword and then calls the intern() method. Print whether the interned string is pointing to the same object as the original string literal.

Code Example:

```
String str1 = new String("hello");  
String str2 = str1.intern();  
String str3 = "hello";
```

Expected Output:

Is str2 and str3 pointing to the same object? true

```
public class StringInternExample {                                     //code30  
    public static void main(String[] args) {  
        String str1 = new String("hello");  
        String str2 = str1.intern();  
        String str3 = "hello";  
        System.out.println("Is str2 and str3 pointing to the same object? " + (str2 == str3));  
    }  
}
```


Question 31: Multiple String Literals with Same Content

Problem Statement:

Write a Java program that declares three string literals with the same content and prints whether all three strings refer to the same object using the == operator.

Code Example:

```
String str1 = "java";  
String str2 = "java";  
String str3 = "java";
```

Expected Output:

All strings point to the same object: true

```
public class StringLiteralPoolExample { //code31  
    public static void main(String[] args) {  
        String str1 = "java";  
        String str2 = "java";  
        String str3 = "java";  
        boolean result = (str1 == str2) && (str2 == str3);  
  
        System.out.println("All strings point to the same object: " + result);  
    }  
}
```

More Pattern (to build more logic-If you get extra time, toh hi karna):<https://www.geeksforgeeks.org/java/java-pattern-programs/>

NOTE: CONGRATULATIONS WHO COMPLETED THIS..

(If you completed this complete assignment - Write in the whatsapp group “Yeh Dil Mange More”)