Bridge course Day 3

Section 1: While Loop

1.Problem Statement: Print numbers from 10 to 1, then “Blastoff!”
Algorithm
Step 1: Start
Step 2: Declare the variable with values 10
Step 3: Use a while loop for printing the numbers
Step 4: Print Blastoff! at the end
Step 5: End

Pseudo code:
Start
Declare a variable with values as 10
Declare another variable with value 0
Initialise while loop
Print i+1
Increment I value by 1
End while loop
Print “Blastoff!”
End

CODE:

```
package whileLoop;

public class CountDown {
	public static void main(String[] args) {
		int n=10;
		int i=0;
		while(i<n) {
			System.out.println(i+1);
			i=i+1;
		}
		System.out.println("Blastoff!");
	}
}
```

TC 1: n=10

```
1
2
3
4
5
6
7
8
9
10
Blastoff!
```

TC 2: n=15

```
1
2
3
4
5
6
7
```


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```
8
9
10
11
12
13
14
15
Blastoff!
```

TC 3: n=5

```
1
2
3
4
5
Blastoff!
```

Observation: The results of the program is a Boolean value where the output is true for the values that satisfied by the condition or else its false.

2.Problem Statement: Ask user for numbers repeatedly until they enter 0. Sum and print the total.

Algorithm

Step 1: Start
Step 2: Declare sum as 0
Step 3: Use while loop for iteration
Step 4: Take input from user and compare whether it is 0 or not
Step 5: if not 0 then add up the input
Step 6: Print the sum at the last
Step 7: End

Pseudo code:

Start
  Declare a variable
    Initialise while loop
      Seek input from the user
      Compare the input for not to be zero
      If not sum up the input or break
   End while loop
  Print sum
End

CODE:

```
package whileLoop;
import java.util.Scanner;
public class SumUnitZero {
        public static void main(String[] args) {
                // TODO Auto-generated method stub
                int sum=0;
                Scanner sc=new Scanner(System.in);
                while(true) {
                System.out.println("Enter number and to stop enter 0: ");
                int number=sc.nextInt();
                if(number!=0) {
                        sum=sum+number;
                }else {
                        break;
                }
                }
                System.out.println("sum is "+sum);
```

```
}
}
```

TC 1: 4 numbers 3,6,2,0

```
Enter number and to stop enter 0:
3
Enter number and to stop enter 0:
6
Enter number and to stop enter 0:
2
Enter number and to stop enter 0:
0
sum is 11
```

TC 2: 8 numbers 53,23,12,46,8,3,67,0

```
Enter number and to stop enter 0:
53
Enter number and to stop enter 0:
23
Enter number and to stop enter 0:
12
Enter number and to stop enter 0:
46
Enter number and to stop enter 0:
8
Enter number and to stop enter 0:
3
Enter number and to stop enter 0:
67
Enter number and to stop enter 0:
0
sum is 212
```

Observation: The program works using the comparison operators where the both the input and declared string are compare and if the string are same then the results will be true else the results false.

3.Problem Statement: Generate a random number between 1 and 10. Ask user to guess. Provide feedback and loop until correct.

Algorithm
Step 1: Start
Step 2: Generate a number using random generator
Step 3: Taking input from the user (num)
Step 4: Comparing the input with the number
Step 5: Print output according to the condition
Step 6: End

Pseudo code:
Start
  Generate a number using a random generator
    Initialise while loop
      Seek input from the user
      Compare the input with the generated number
      Print output according to the condition
    End while loop
End

CODE:

```
package whileLoop;
```

```java
import java.util.*;
public class GuessTheNumber {
        public static void main(String[] args) {
                // TODO Auto-generated method stub
                Random ran=new Random();
                Scanner sc=new Scanner(System.in);
                int num=ran.nextInt(10)+1;
                System.out.println("guess a number between 1 and 10:");
                while(true) {
                        System.out.println("enter the number you have guessed: ");
                        int a=sc.nextInt();
                        if(a<num) {
                                System.out.println("guess greater number");
                        }else if(a>num) {
                                System.out.println("guess smaller number");
                        }else {
                                System.out.println("correct!");
                                break;
                        }
                }

}
}
```

TC 1:

```
guess a number between 1 and 10:
enter the number you have guessed:

3
guess greater number
enter the number you have guessed:
6
guess greater number
enter the number you have guessed:

9
guess greater number
enter the number you have guessed:

10
correct!
```

TC 2:

```
guess a number between 1 and 10:
enter the number you have guessed:
2
guess greater number
enter the number you have guessed:
4
guess greater number
enter the number you have guessed:
6
guess greater number
enter the number you have guessed:
8
guess smaller number
enter the number you have guessed:

7
correct!
```

TC 3:

```
guess a number between 1 and 10:
enter the number you have guessed:
4
guess greater number
enter the number you have guessed:

8
guess greater number
enter the number you have guessed:
```


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```
9
correct!
```

Observation: The results of the program is to determine the range on the input values in the range given. That is done using the if-else conditions and logical operators.

4.Problem Statement: Infinite Loop Debugging Analyze and fix:
Code:

```
package whileLoop;

public class LoopDebugging {

	public static void main(String[] args) {
		// TODO Auto-generated method stub
		int counter=0;
		while(counter<5) {
			System.out.println("Hello");
			counter++;
		}

	}

}
```

Output:

```
Hello
Hello
Hello
Hello
Hello
```

Section 2: For Loop

1.Problem Statement: Even Numbers Print even numbers from 2 to 20 using a for loop.

Algorithm
Step 1: Start
Step 2: Declare variable as 20
Step 3: Using for loop to increment the values
Step 4: Print output
Step 5: End

Pseudo code:
Start
  Declare num
  Initialise for loop
   Print the number
  End the for loop
End

CODE:

```
package forLoop;

public class EvenNumber {

	public static void main(String[] args) {
		// TODO Auto-generated method stub
		int n=20;
		System.out.println("printing the even number in the range of 2 to "+n);
```

```
                for(int i=2;i<=n;i=i+2) {
                        System.out.println(i);
                }

        }

}
```

OUTPUT

```
printing the even number in the range of 2 to 20
2
4
6
8
10
12
14
16
18
20
```

Observation: The results of the program is to determine whether the given input is positive or negative or zero. This can be done using simple if-else conditionals.

2.Problem Statement: Calculate n! for user input n. Handle edge case when n == 0.

Algorithm

Step 1: Start
Step 2: Taking input from the user
Step 3: Comparing the input whether greater than 2 or not
Step 4: Print output if less than 2
Step 5: Perform factorial using for loop
Step 6: Print the Factorial of the number
Step 7: End

Pseudo code:

Start
Input num
Condition for >2 using if else statements
Print output as 1 if the number<2
Else find the factorial using for loop
End the for loop
Print the factorial of the number
End

CODE:

```
package forLoop;
import java.util.Scanner;
public class FactorialCalculator {

        public static void main(String[] args) {
                // TODO Auto-generated method stub
                Scanner sc=new Scanner(System.in);
                System.out.println("enter the value: ");
                int n=sc.nextInt();
                int fact=1;
                if(n==0) {
                        System.out.println("The factorial for "+ n+" is 1");
                }else if(n==1) {
                        System.out.println("The factorial for "+ n+" is 1");
                }else {
                        for(int i=n;i>=1;i--) {
                                fact=fact*i;
```

```
                        }
                        System.out.println("the factorial for "+n+" is "+fact);
                }

        }

}
```

TC 1: num=5

```
enter the value:
5
the factorial for 5 is 120
```

TC 2: num=15

```
enter the value:
15
the factorial for 15 is 2004310016
```

TC 1: num=7

```
enter the value:
15
the factorial for 15 is 2004310016
```

Observation: The results of the program is to determine whether the given age is greater than 18 or not. This can be done using simple if-else conditionals.

3.Problem Statement: Ask for a string input. Count how many times ‘a’ or ‘A’ appears..

Algorithm
Step 1: Start
Step 2: Taking input string from the user
Step 3: Using for loop for traversal through the string
Step 4: Check for ‘a’ in the string
Step 5: Print the output
Step 6: End

Pseudo code:
Start
Seek a string
Declare the count as 0
Initialise for loop
Check for ‘a’ using if else loop
If ‘a’ is found, then increment the value of count
End the for loop
Print results
End

CODE:

```
package forLoop;
import java.util.Scanner;
public class CountString {

        public static void main(String[] args) {
                // TODO Auto-generated method stub
                Scanner sc=new Scanner(System.in);
                System.out.println("enter the string: ");
                String a=sc.nextLine();
                //String n= a.toLowerCase();
                int count=0;
                for(int i=0;i<a.length();i++) {
```

```
                        char c=a.charAt(i);
                        if(c=='a'||c=='A') {
                                count++;
                        }
                }
                System.out.println(" The string have "+count+" occurrence of a");
        }

}
```

TC 1: String= welcome

```
enter the string:
welcome
 The string have 0 occurrence of a
```

TC 2: String= an apple for a day keeps the doctor away

```
enter the string:
an apple for a day keeps the doctor away
 The string have 6 occurrence of a
```

TC 3: String= AaaabbaAA

```
enter the string:
AaaabbaAA
 The string have 7 occurrence of a
```

Observation: The results of the program is to determine the output of the given operator and numbers as like the calculator. That is done using the if-else conditions and logical operators.

4.Problem Statement:
Simple Star Pattern Print:

*****

Using one for loop..

Algorithm
Step 1: Start
Step 2: Seek input for the user
Step 3: Using for loop for iteration
Step 4: Print output
Step 5: End

Pseudo code:
Start
  Declare num
  Initialise for loop
   Print '*'
  End the for loop
End

CODE:

```
package forLoop;
```

```
import java.util.Scanner;
public class StarPattern {
        public static void main(String[] args) {
                Scanner sc=new Scanner(System.in);
                System.out.println("enter the value for n: ");
                int n=sc.nextInt();
                for(int i=0;i<n;i++) {
                        System.out.print('*');
                }

        }

}
```

TC 1: n=5

```
enter the value for n:
5
*****
```

TC 2: n=7

```
enter the value for n:
7
*******
```

TC 3: n=2

```
enter the value for n:
2
**
```

Observation: The results of the program is to determine how much should one pay for ticket according to their age and student status yes or no. This can be done using simple if-else conditionals.

Section 3: Loop Control

Problem Statement: Check if a number is prime using a loop and break.

Algorithm
Step 1: Start
Step 2: Taking input from the user
Step 3: Using for loop for iteration
Step 4: Check if the number has any factor
Step 5: Print prime if no factor is found
Step 6: End

Pseudo code:
Start
Seek input from user
Initialise for loop
Initialise if else loop
Check for factor
End for loop
Print output according to the condition
End

CODE:

```
package loopControl;
import java.util.*;
```

```java
public class PrimeNumber {

	public static void main(String[] args) {
		// TODO Auto-generated method stub
		Scanner sc=new Scanner(System.in);
		System.out.println("Enter the number: ");
		int n=sc.nextInt();
		boolean res=false;
		for(int i=2;i<=n/2;i++) {
			if(n%i==0) {
				res=true;
				break;
			}
		}
		if(res==true) {
			System.out.println("the given number is a not prime number");
		}else {
			System.out.println("the given number is a prime number");
		}
	}
}
```

TC 1: num=45

```
Enter the number:
45
the given number is a not prime number
```

TC 2: num=12

```
Enter the number:
12
the given number is a not prime number
```

TC 3: num=23

```
Enter the number:
23
the given number is a prime number
```

2.Problem Statement: Input 5 numbers. Use continue to skip negative ones and sum the rest.

Algorithm
Step 1: Start
Step 2: Declare sum and count
Step 3: Using while loop for 5 inputs
Step 4: Check if the number for negative or not
Step 5: If not negative sum up the number
Step 6: Print the results
Step 7: End

Pseudo code:
Start
  Seek input for count and sum
  Comparing the num using if else condition
    Print output
End

CODE:

```
package loopControl;
import java.util.Scanner;
public class SkipNegitive {

	public static void main(String[] args) {
		// TODO Auto-generated method stub
		Scanner sc=new Scanner(System.in);
		int count=0;
		int sum=0;
		while(count<5) {
			System.out.println("enter a number: ");
			int a=sc.nextInt();
			count++;
			if(a<0) {
				continue;
			}else {
				sum=sum+a;
			}
		}
		System.out.println("sum is "+sum);
	}

}
```

OUTPUT:

```
enter a number:
3
enter a number:
6
enter a number:
1
enter a number:
0
enter a number:
-6
sum is 10
```

3.Problem Statement: Input rows and cols, print a rectangle of *.

Algorithm
Step 1: Start
Step 2: Taking input from the user
Step 3: Using nested for loop
Step 4: Print '*'
Step 5: End

Pseudo code:
Start
Input l and b
Initialise for loop
Initialise for loop
Print *
End for
End for
End

CODE:

```
package loopControl;
```

```java
import java.util.Scanner;
public class RectanglePattern {

	public static void main(String[] args) {
		// TODO Auto-generated method stub
		Scanner sc=new Scanner(System.in);
		System.out.println("enter the values of l: ");
		int l=sc.nextInt();
		System.out.println("enter the values of b: ");
		int b=sc.nextInt();
		for(int i=0;i<b;i++) {
			for(int j=0;j<l;j++) {
				System.out.print("*");
			}
			System.out.println();
		}

	}

}
```

TC 1: l=7 b=3

```
enter the values of l:
7
enter the values of b:
3
*******
*******
*******
```

TC 2: l=4 b=7

```
enter the values of l:
4
enter the values of b:
7
****
****
****
****
****
****
****
```

TC 3: l=3 b=5

```
enter the values of l:
3
enter the values of b:
5
***
***
***
***
***
```

4.Problem Statement: Input height. Print right-angled triangle with *.

Algorithm

Step 1: Start

Step 2: Taking input from the user

Step 3: Using nested for loop

Step 4: Print '*'

Step 5: End

Pseudo code:

Start
Input n
Initialise for loop
Initialise for loop
Print *
End for
End for
End

CODE:

```
package loopControl;
import java.util.Scanner;
public class trianglePattern {

	public static void main(String[] args) {
		// TODO Auto-generated method stub
		Scanner sc=new Scanner(System.in);
		System.out.println("enter the number of rows: ");
		int n=sc.nextInt();
		for(int i=0;i<n;i++) {
			for(int j=0;j<=i;j++) {
				System.out.print("*");
			}System.out.println();
		}
	}

}
```

TC 1: n=5

```
enter the number of rows:
5
*
**
***
****
*****
```

TC 2: n=3

```
enter the number of rows:
3
*
**
***
```

TC 3: n=6

```
enter the number of rows:
6
*
**
***
****
*****
******
```

5.Problem Statement: Input height. Print centred pyramid:

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

Algorithm
Step 1: Start
Step 2: Taking input from the user
Step 3: Using nested for loop
Step 4: Print '*'
Step 5: End

Pseudo code:
Start
Input n
Initialise for loop
Initialise for loop
Print *
End for
End for
End

CODE:

```
package loopControl;
import java.util.Scanner;
public class PyramidPattern {

        public static void main(String[] args) {
                // TODO Auto-generated method stub
                Scanner sc=new Scanner(System.in);
                System.out.println("enter the number of rows: ");
                int n=sc.nextInt();
                for (int i = 1; i <= n; i++) {
            // Print spaces
            for (int j = 1; j <= n - i; j++) {
                System.out.print(" ");
            }
            // Print stars
            for (int k = 1; k <= 2 * i - 1; k++) {
                System.out.print("*");
            }System.out.println();
                }

        }

}
```

TC 1: n=5

```
enter the number of rows:
5
    *
   ***
  *****
 *******
*********
```

TC 2: n=3

```
enter the number of rows:
3
  *
 ***
*****
```

TC 3: n=4

```
enter the number of rows:
4
   *
  ***
 *****
*******
```