Bridge Course - Day 03

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Activity 1:Repetitive Tasks List three tasks you perform regularly that involve repetition. For each:

1. What is being repeated?
2. What determines when it stops?

1.1 Algorithm:

1.1.1 Algorithm to solve coding problems daily:

Step 1: Start
Step 2: Input the number of problems to be solved (totalProblems)
Step 3: Repeat the following steps from i = 1 to totalProblems
Step 4: Display “Solving problem i...”
Step 5: After the loop ends, display “You have completed all problems.”
Step 6: Stop

1.1.2 Algorithm to check emails:

Step 1: Start
Step 2: Set number of unread emails (e.g., 5)
Step 3: While unread emails > 0, repeat:
Step 4: Read one email
Step 5: Reduce unread email count by 1
Step 6: End loop when unread emails = 0
Step 7: Print "Inbox is clear!"
Step 8: Stop

1.1.3 Algorithm to attend class:

Step 1: Start
Step 2: Set total number of classes (e.g., 3)
Step 3: For each class from 1 to total classes, repeat:
Step 4: Print "Attending class [i]"
Step 5: After loop ends, print "All classes attended"
Step 6: Stop

1.2 Pseudocode:

1.2.1 Pseudocode for solving coding problems:

```
Start
Read totalProblems
For i ← 1 to totalProblems do
    Print "Solving problem i..."
End For
Print "You have completed totalProblems problems. Good job!"
Stop
```

1.2.2 Pseudocode for Checking mails:

```
Start
Set unreadEmails ← 5

While unreadEmails > 0 do
    Print "Reading an email..."
    unreadEmails ← unreadEmails - 1
End While

Print "Inbox is clear!"
Stop
```

1.2.3 Pseudocode for attending class:

```
Start
Set totalClasses ← 3

For i ← 1 to totalClasses do
    Print "Attending class", i
End For

Print "All classes attended for the day!"
Stop
```

1.3 Code:

1.3.1 Solving coding problems:

```
import java.util.Scanner;

public class D3_1 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter how many coding problems you want to solve: ");
        int totalProblems = sc.nextInt();

        for (int i = 1; i <= totalProblems; i++) {
            System.out.println("Solving problem " + i + "...");
        }
        System.out.println("You have completed " + totalProblems + " problems. Good job!");
    }
}
```

1.3.2 Checking emails:

```
public class D3_1{
    public static void main(String[] args) {
        int unreadEmails = 5;

        while (unreadEmails > 0) {
            System.out.println("Reading an email...");
            unreadEmails--;    }
        System.out.println("Inbox is clear!");
    }
}
```

1.3.3 Attending classes:

```
public class D3_1 {
	public static void main(String[] args) {
		int totalClasses = 3;

		for (int i = 1; i <= totalClasses; i++) {
			System.out.println("Attending class " + i);
		}
		System.out.println("All classes attended for the day!");
	}
}
```

1.4 Output:

Case 1: Solving coding

```
774c2/redhat.java/jdt_ws/StemUp\ BridgeCourse_994dd6f4/b
Enter how many coding problems you want to solve: 3
Solving problem 1...
Solving problem 2...
Solving problem 3...
You have completed 3 problems. Good job!
(base) sariyamazhar@SARIYAs-Air StemUp BridgeCourse %
```

Case 2: Checking emails

```
hines/jdk-24.jdk/Contents/Home/bin/java --enable-previ
Code/User/workspaceStorage/470f142dc3020e2428b4528a3fc
Reading an email...
Reading an email...
Reading an email...
Reading an email...
Reading an email...
Inbox is clear!
(base) sariyamazhar@SARIYAs-Air StemUp BridgeCourse %
```

Case 3: Attending classes

```
hines/jdk-24.jdk/Contents/Home/bin/java --enable-previ
Code/User/workspaceStorage/470f142dc3020e2428b4528a3fc
Attending class 1
Attending class 2
Attending class 3
All classes attended for the day!
(base) sariyamazhar@SARIYAs-Air StemUp BridgeCourse %
```

Activity 2: Code Duplication

- **Write how you would print “Hello!” 10 times without loops. Reflect on how loops make this easier for 1000 times**

2.1 Algorithm:

Step 1: Print “Hello!”
Step 2: Repeat the print statement 10 times manually
Step 3: Done

2.2 Pseudocode:

```
PRINT "Hello!"
PRINT "Hello!"
PRINT "Hello!"
PRINT "Hello!"
PRINT "Hello!"
PRINT "Hello!"
PRINT "Hello!"
PRINT "Hello!"
PRINT "Hello!"
PRINT "Hello!"
```

2.3 Code:

```
public class D3_2 {
	public static void main(String[] args) {
		System.out.println("Hello!");
		System.out.println("Hello!");
		System.out.println("Hello!");
		System.out.println("Hello!");
		System.out.println("Hello!");
		System.out.println("Hello!");
		System.out.println("Hello!");
		System.out.println("Hello!");
		System.out.println("Hello!");
		System.out.println("Hello!");
	}
}
```

2.4 Output:

Activity 3: Countdown Print numbers from 10 to 1, then "Blastoff!"

3.1 Algorithm:

Step 1: Set number = 10

Step 2: While number ≥ 1

a. Print the number

b. Decrement the number by 1

Step 3: Print "Blastoff!"

3.2 Pseudocode:

```
set number = 10
while number >= 1
    print number
    number = number - 1
end while
print "blastoff!"
```

3.3 Code:

```
public class D3_3{
    public static void main(String[] args) {
        for (int i = 10; i >= 1; i--) {
            System.out.println(i);
```

```
            }
            System.out.println("Blastoff!");
        }
    }
```

3.4 Output

Activity 4: Sum Until Zero Ask user for numbers repeatedly until they enter 0. Sum and print the total.

4.1 Algorithm:

Step 1: Initialize sum = 0

Step 2: Repeat:

a. Ask user to enter a number

b. If number is 0 → stop

c. Else → add number to sum

Step 3: Print the total sum

4.2 Pseudocode:

```
SET sum = 0
REPEAT
    INPUT number
    IF number != 0 THEN
        sum = sum + number
    END IF
UNTIL number == 0
PRINT "Total sum is", sum
```

4.3 Code:

```
import java.util.Scanner;

public class D3_4 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int number, sum = 0;

        do {
            System.out.print("Enter a number (0 to stop): ");
            number = scanner.nextInt();
            sum += number;
        } while (number != 0);

        System.out.println("Total sum is: " + sum);
    }
}
```

4.4 Output:

Case1: input of 1 number

Case2: input of 5 values until I press 0.

Case3: input of 7 values until I press 0.

```
ew -XX:+ShowCodeDetailsInExceptionMessages -cp /Users/sariyamazhar/Li
774c2/redhat.java/jdt_ws/StemUp\ BridgeCourse_994dd6f4/bin D3_4
Enter a number (0 to stop): 2
Enter a number (0 to stop): 0
Total sum is: 2
(base) sariyamazhar@SARIYAs-Air StemUp BridgeCourse %  cd /Users/sari
hines/jdk-24.jdk/Contents/Home/bin/java --enable-preview -XX:+ShowCod
Code/User/workspaceStorage/470f142dc3020e2428b4528a3fc774c2/redhat.ja
Enter a number (0 to stop): 3
Enter a number (0 to stop): 4
Enter a number (0 to stop): 4
Enter a number (0 to stop): 5
Enter a number (0 to stop): 0
Total sum is: 16
(base) sariyamazhar@SARIYAs-Air StemUp BridgeCourse %  cd /Users/sari
hines/jdk-24.jdk/Contents/Home/bin/java --enable-preview -XX:+ShowCod
Code/User/workspaceStorage/470f142dc3020e2428b4528a3fc774c2/redhat.ja
Enter a number (0 to stop): 3
Enter a number (0 to stop): 5
Enter a number (0 to stop): 8
Enter a number (0 to stop): 7
Enter a number (0 to stop): 9
Enter a number (0 to stop): 6
Enter a number (0 to stop): 0
Total sum is: 38
(base) sariyamazhar@SARIYAs-Air StemUp BridgeCourse %
```

Activity 5: Guess the number. Generate a random number between 1 and 10. Ask user to guess. Provide feedback and loop until correct.

5.1 Algorithm:

Step 1: Generate a random number between 1 and 10 and store in target
Step 2: Repeat:
    a. Ask user to guess a number
    b. If guess < target → print "Too low"
    c. If guess > target → print "Too high"
    d. If guess == target → print "Correct!" and stop
Step 3: End

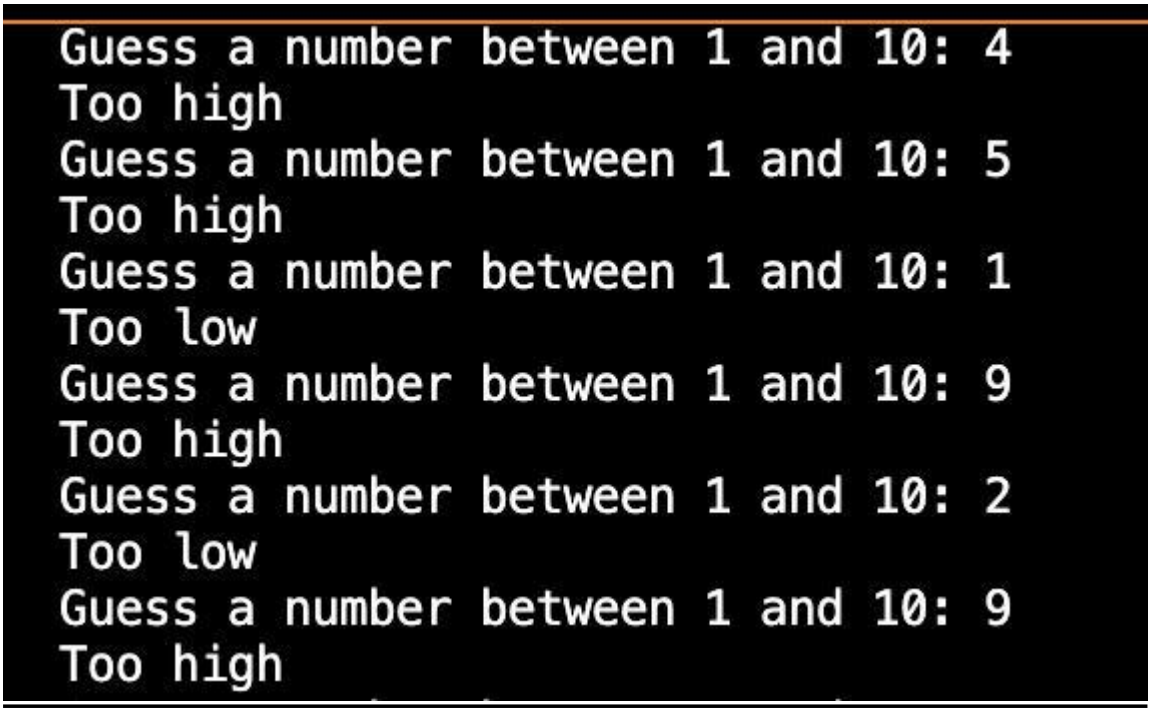
5.2 Pseudocode:

```
set target = random number between 1 and 10

repeat
    input guess
    if guess < target then
        print "too low"
    else if guess > target then
        print "too high"
    else
        print "correct!"
    end if
until guess == target
```

5.3 Code:

```
import java.util.Scanner;
import java.util.Random;

public class D3_5 {
    public static void main(String[] args) {
        Random rand = new Random();
        int target = rand.nextInt(10) + 1;
        Scanner scanner = new Scanner(System.in);
        int guess;

        do {
            System.out.print("Guess a number between 1 and 10: ");
            guess = scanner.nextInt();

            if (guess < target) {
                System.out.println("Too low");
            } else if (guess > target) {
                System.out.println("Too high");
            } else {
                System.out.println("Correct!");
            }
        } while (guess != target);
    }
}
```

5.4 Output:



Activity 6: Infinite Loop Debugging Analyze and fix:

```
int counter = 0;
while (counter < 5) {
System.out.println("Hello");
}
```

6.1 Algorithm:

Step1: Initialize counter = 0
Step2: While counter < 5:
    a. Print "Hello"
    b. Increment counter
Step3: End

6.2 Pseudocode:

```
SET counter = 0

WHILE counter < 5
    PRINT "Hello"
    counter = counter + 1
END WHILE
```

6.3 Code:

6.3.1 Issue in Code:

```
while (counter < 5) {
    System.out.println("Hello");
}
```

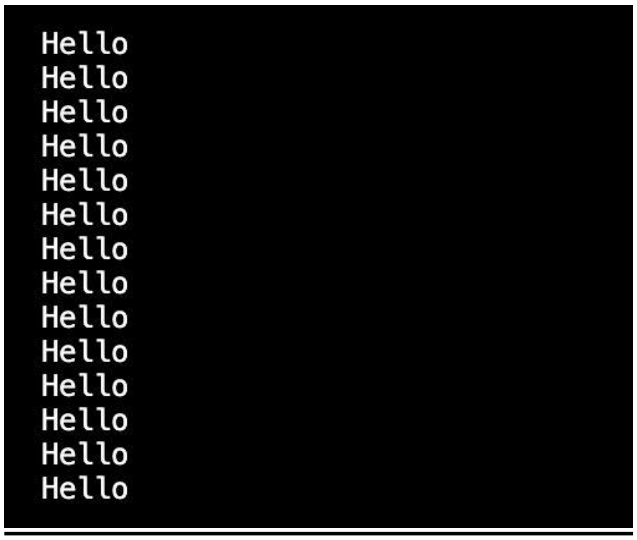
- will run forever because counter is never incremented, so counter < 5 is always true.

6.3.2 Fixed Code:

```
int counter = 0;
while (counter < 5) {
    System.out.println("Hello");
    counter++;    // Fix: increment counter to avoid infinite loop
}
```

6.4 Output:

Case1: issue in code as its running in loop



Case2: Fixed code after incrementing counter

Activity 7: Even Numbers Print even numbers from 2 to 20 using a for loop.

7.1 Algorithm:

Step1: Start
Step2: Declare an integer variable n and assign the value 20 to it.
Step3: Initialize a loop variable i with value 2.
Step4: Repeat the following steps while i < n:
Step5: Check if i % 2 == 0 (i.e., if i is divisible by 2):
Step6: If yes, then print the value of i.
Step7: Increment the value of i by 1.
Step8: End loop
Step9: End

7.2 Pseudocode:

```
start

set n to 20

for i from 2 to n-1 do
    if i mod 2 equals 0 then
        print i
    endif
endfor

End
```

7.3 Code:

```
public class D3_7 {

    public static void main(String[] args) {

        int n=20;
        for (int i=2; i < n; i++){
        if(i%2==0)

            System.out.println(i);

        }
        }
}
```

7.4 Output:

Activity 8: Factorial Calculator Calculate n! for user input n. Handle edge case when n == 0.

8.1 Algorithm:

Step1: Create a scanner object to take user input.
Step2: Prompt the user: “Enter the number”.
Step3: Read the integer input and store it in variable fact.
Step4: Initialize a variable result and set it to 1.
Step5: For each integer i from 2 to fact, do:
Step6: Multiply result by i and store the result back in result.
Step7: End For
Step8: Print the final value of result (which is the factorial).

8.2 Pseudocode:

```
start
prompt user to enter a number
read fact
set result to 1

for i from 2 to fact do
result = result * i
endfor

print result
End
```

8.3 Code:

```
import java.util.Scanner;

public class D3_8 {

        public static void main(String[] args) {
                Scanner sc=new Scanner(System.in);
                System.out.println("enter the number");
                 int fact=sc.nextInt();

                int result=1;

                for(int i=2; i<=fact; i++){
                        result = result *i;
        }
         System.out.println(result);
 }

}
```

8.4 Output:

Case1: input as 6

Case2: input as 3

Case4: input as 10

```
ew -XX:+ShowCodeDetailsInExceptionMessages -cp /Users/sariyamazha
774c2/redhat.java/jdt_ws/StemUp\ BridgeCourse_994dd6f4/bin D3_8
enter the number
6
720
(base) sariyamazhar@SARIYAs-Air StemUp BridgeCourse %  cd /Users/
hines/jdk-24.jdk/Contents/Home/bin/java --enable-preview -XX:+Sho
Code/User/workspaceStorage/470f142dc3020e2428b4528a3fc774c2/redha
enter the number
3
6
(base) sariyamazhar@SARIYAs-Air StemUp BridgeCourse %  cd /Users/
hines/jdk-24.jdk/Contents/Home/bin/java --enable-preview -XX:+Sho
Code/User/workspaceStorage/470f142dc3020e2428b4528a3fc774c2/redha
enter the number
10
3628800
(base) sariyamazhar@SARIYAs-Air StemUp BridgeCourse %
```

Activity 9: Count ‘a’ in String Ask for a string input. Count how many times ‘a’ or ‘A’ appears.

9.1 Algorithm:

Step1: Define a string variable str and assign it the value "javajava".
Step2: Find the total number of characters in str and store it in totalcount.
Step3: Replace all occurrences of 'a' in str with an empty string "", and store the length of the new string in removea.
Step4: Subtract removea from totalcount and store the result in variable count.
Step5: Print count.

9.2 Pseudocode:

start

set str to "javajava"
set totalcount to length of str
set removea to length of str after replacing all 'a' with ""
set count to totalcount - removea
print count

End

9.3 Code:

```
public class D3_9 {

	public class Prob23 {
		public static void main(String[] args) {
		String str = "watermelaaaan";
		int totalcount= str .length();
			int removea = str .replace("a","").length();
			int count=totalcount-removea;
		       System.out.println(count);
		}
	}
}
```

9.4: Output

Case1: input as 6

Case2: input as 3

Case3: input as 10

```
ew -XX:+ShowCodeDetailsInExceptionMessages -cp /Users/sariyamazha
774c2/redhat.java/jdt_ws/StemUp\ BridgeCourse_994dd6f4/bin D3_8
enter the number
6
720
(base) sariyamazhar@SARIYAs-Air StemUp BridgeCourse %  cd /Users/
hines/jdk-24.jdk/Contents/Home/bin/java --enable-preview -XX:+Sho
Code/User/workspaceStorage/470f142dc3020e2428b4528a3fc774c2/redha
enter the number
3
6
(base) sariyamazhar@SARIYAs-Air StemUp BridgeCourse %  cd /Users/
hines/jdk-24.jdk/Contents/Home/bin/java --enable-preview -XX:+Sho
Code/User/workspaceStorage/470f142dc3020e2428b4528a3fc774c2/redha
enter the number
10
3628800
(base) sariyamazhar@SARIYAs-Air StemUp BridgeCourse %
```

Activity 10: Simple Star Pattern Print: *** Using one for loop.

10.1 Algorithm:

Step1: Initialize a loop variable i with value 1.
Step2: Repeat the following steps while i ≤ 5:
Step3: Print "*" without moving to the next line.
Step4: Increment i by 1.
Step5: End loop

10.2 Pseudocode:

START

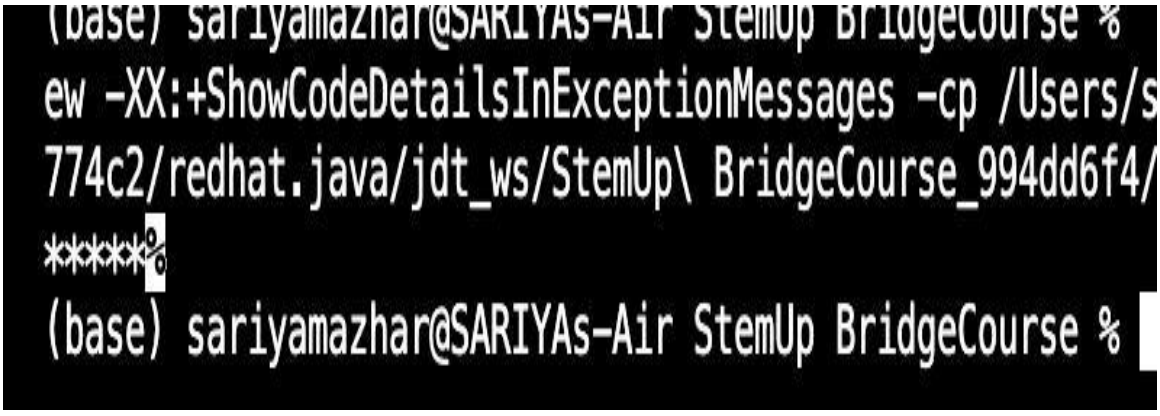
FOR i FROM 1 TO 5 DO
    PRINT "*", without newline
ENDFOR

END

10.3 Code:

```
public class D3_10 {
        public static void main(String[] args){
          for (int i=1; i <=5; i++){
                System.out.print("*");

          }
        }
    }
```

10.4 Output:



Activity 11: Prime Checker Check if a number is prime using a loop and break.

11.1 Algorithm:

Problem 3.11: Prime Checker Check if a number is prime using a loop and break.
Step 1: Start
Step 2: Input a number no from the user
Step 3: Initialize a boolean variable flag to true
Step 4: If no is less than or equal to 1, set flag to false
Step 5: Loop from i = 2 to i < no
Step 6: If no % i == 0, set flag = false and break the loop
Step 7: If flag == true, print "Prime number"
Step 8: Else, print "Not a prime"
Step 9: Stop

11.2 Pseudocode:

```
Start
Read no
Set flag ← true

If no ≤ 1 then
    flag ← false
Else
    For i ← 2 to no - 1 do
        If no mod i = 0 then
            flag ← false
            Break
        End If
    End For
End If

If flag = true then
    Print "Prime number: ", no
Else
    Print "Not a prime: ", no
End If
Stop
```

11.3 Code:

```
import java.util.Scanner;
public class D3_1 {
    public static void main(String[] args) {
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter a number");
        int no=sc.nextInt();
        boolean flag=true;

            for(int i=2;i<no;i++){
                if(no%i==0){
                    flag=false;
```

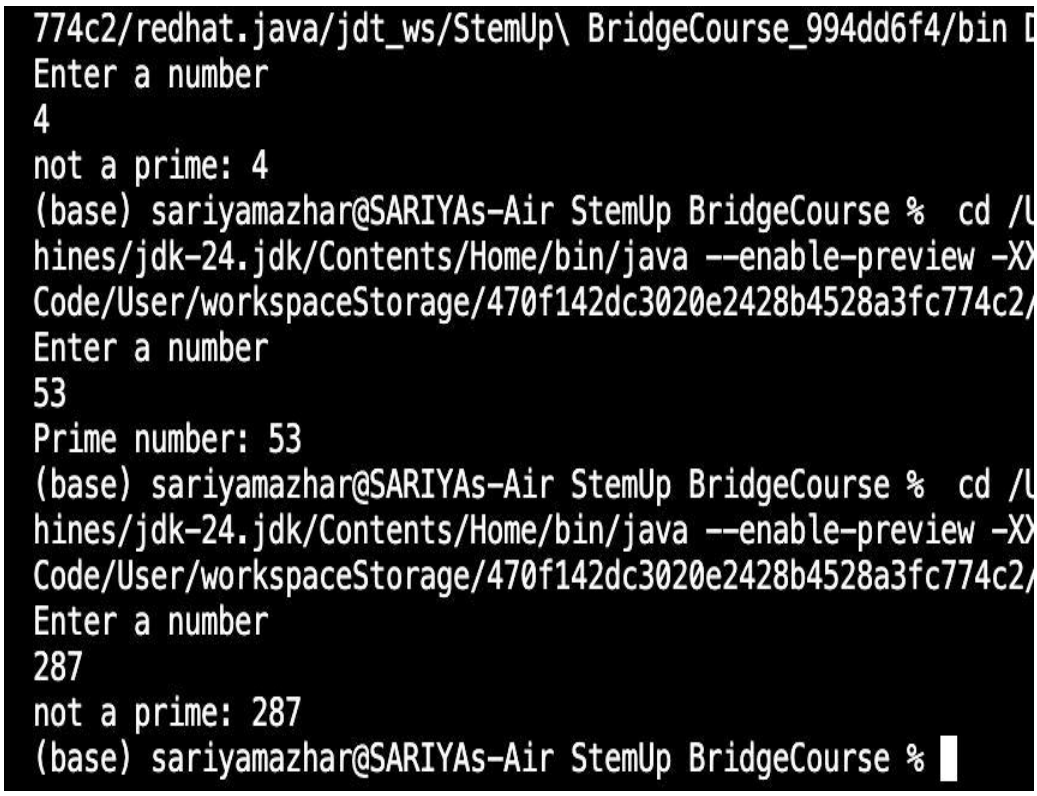
```
                    break;
                }
            }
            if(flag==true){
                System.out.println("Prime number: "+no);
            }else{
                System.out.println("not a prime: "+no);
            }
            }
    }
```

11.4 Output:

Case1: input as 4

Case2: input as 53

Case3: input as 287



Activity 12: Skip Negatives Input 5 numbers. Use continue to skip negative ones and sum the rest.

12.1 Algorithm:

Step 1: Start
Step 2: Initialize sum to 0
Step 3: Repeat the following steps 5 times
Step 4: Read a number num
Step 5: If num < 0, skip this iteration using continue
Step 6: Otherwise, add num to sum
Step 7: After the loop ends, print the value of sum
Step 8: Stop

12.2 Pseudocode:

```
Start
Set sum ← 0

Repeat 5 times:
    Read num
    If num < 0 then
        Continue to next iteration
    End If
    sum ← sum + num
End Repeat

Print "Sum of non-negative numbers: ", sum
Stop
```

12.3 Code:

```
mport java.util.Scanner;

public class D3_12 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int sum = 0;
        System.out.println("Enter 5 numbers:");
        for (int i = 1; i <= 5; i++) {
            int num = sc.nextInt();

            if (num < 0) {
                continue;
            }
            sum += num;
        }

        System.out.println("Sum of non-negative numbers: " + sum);

    }
}
```

12.4 Output:

Case1: All positive integers

Case2: Different positive integers

Case3: positive with negative

```
774c2/redhat.java/jdt_ws/StemUp\ BridgeCourse_994dd6f4/bin D3_12
Enter 5 numbers:
4
6
7
8
9
Sum of non-negative numbers: 34
(base) sariyamazhar@SARIYAs-Air StemUp BridgeCourse %  cd /Users/sariyam
hines/jdk-24.jdk/Contents/Home/bin/java --enable-preview -XX:+ShowCodeDe
Code/User/workspaceStorage/470f142dc3020e2428b4528a3fc774c2/redhat.java/
Enter 5 numbers:
56
78
98
600
1
Sum of non-negative numbers: 833
(base) sariyamazhar@SARIYAs-Air StemUp BridgeCourse %  cd /Users/sariyam
hines/jdk-24.jdk/Contents/Home/bin/java --enable-preview -XX:+ShowCodeDe
Code/User/workspaceStorage/470f142dc3020e2428b4528a3fc774c2/redhat.java/
Enter 5 numbers:
-1
-67
-89
-56
12
Sum of non-negative numbers: 12
(base) sariyamazhar@SARIYAs-Air StemUp BridgeCourse %
```

Activity 13: Pyramid Pattern Challenge Input height. Print centered pyramid.

13.1 Algorithm:

Step 1: Start
Step 2: Input the height of the pyramid
Step 3: Repeat the following steps for i from 1 to height
Step 4: Print height - i number of spaces
Step 5: Print 2 * i - 1 number of * characters
Step 6: Move to the next line
Step 7: End outer loop
Step 8: Stop

13.2 Pseudocode:

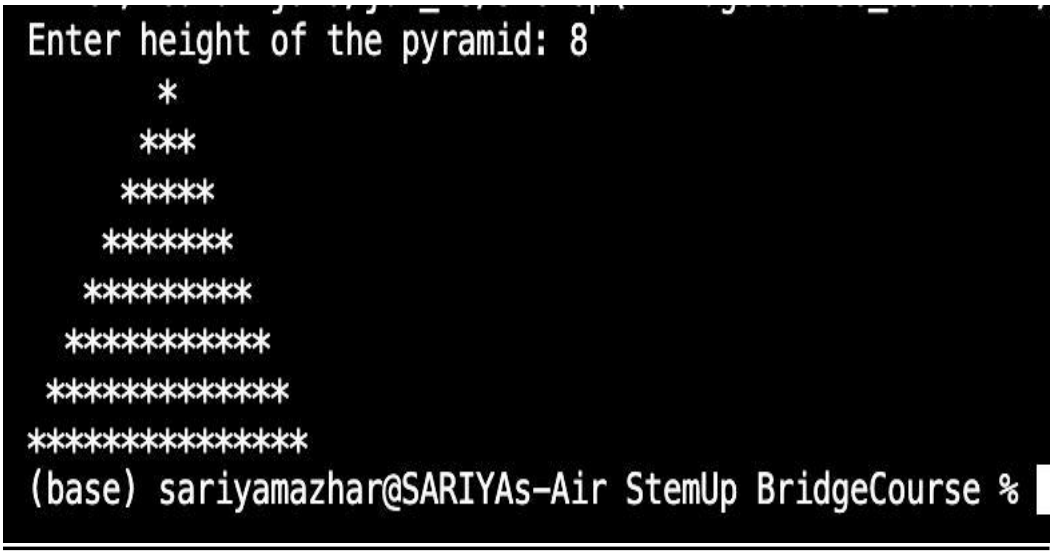
```
Start
Read height
For i ← 1 to height do
    For j ← 1 to height - i do
        Print " "
    End For
```

```
            For k ← 1 to (2 * i - 1) do
                  Print "*"
            End For
            Print new line
      End For
      Stop
```

13.3 Code:

```
import java.util.Scanner;

public class D3_15 {
	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);

		System.out.print("Enter height of the pyramid: ");
		int height = sc.nextInt();

		for (int i = 1; i <= height; i++) {

			for (int j = 1; j <= height - i; j++) {
				System.out.print(" ");
			}

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

		sc.close();
	}
}
```

13.4 Output:



Activity 14: Rectangle Pattern Input rows and cols, print a rectangle of *.

14.1 Algorithm:

Step 1: Start
Step 2: Input the number of rows and cols
Step 3: Repeat the following steps for i from 1 to rows
Step 4: Repeat the following steps for j from 1 to cols
Step 5: Print "* " without newline
Step 6: After inner loop ends, print newline to move to next row
Step 7: End outer loop
Step 8: Stop

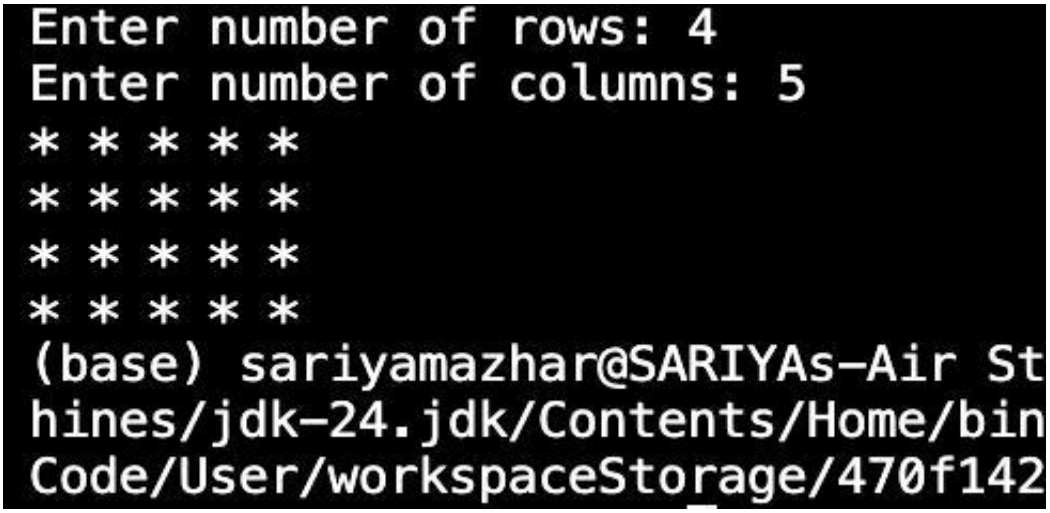
14.2 Pseudoode:

```
Start
Read rows
Read cols

For i ← 1 to rows do
    For j ← 1 to cols do
        Print "* "
    End For
    Print new line
End For

Stop
```

14.2 Code:

```
import java.util.Scanner;

public class D3_13 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        System.out.print("Enter number of rows: ");
        int rows = sc.nextInt();

        System.out.print("Enter number of columns: ");
        int cols = sc.nextInt();

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

14.3 Output:



Activity 15: Triangle Pattern where the user inputs the height and the program prints a right-angled triangle made of *.

15.1 Algorithm:

Step 1: Start
Step 2: Input the height of the triangle
Step 3: Repeat the following steps for i from 1 to height
Step 4: Repeat the following steps for j from 1 to i
Step 5: Print "* " without newline
Step 6: After inner loop ends, print newline to move to next row
Step 7: End outer loop
Step 8: Stop

15.2 Pseudocode:

```
Start
Read height
For i ← 1 to height do
    For j ← 1 to i do
        Print "* "
    End For
    Print new line
End For
Stop
```

15.3 Code:

```
mport java.util.Scanner;

public class D3_14 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        System.out.print("Enter height of the triangle: ");
        int height = sc.nextInt();
```

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

            sc.close();
        }
}
```

15.4 Output: