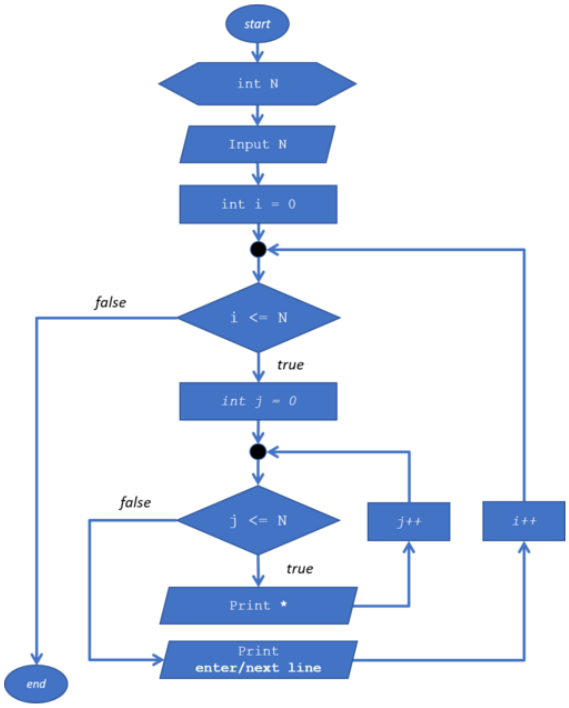
Faricha Aulia

Jobsheet 7

Experiment 1

Pay attention to the Flowchart below



In the 1st experiment, an experiment on nested loops will be conducted. The case to be solved is to create a square *, with side lengths of N. Suppose N is entered 5, then the result is

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

Because the program requires input from the keyboard, it is necessary to import the Scanner class

Type the program code below

```
In [4]: // Write Experiment Code 1 Step 4 above
import java.util.Scanner;

int N;
Scanner sc = new Scanner(System.in);
System.out.print("Enter the value of N : ");
N = sc.nextInt();

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

```
Enter the value of N : 7
********
```

Note the looping syntax used to print * N times sideways. In step 4 above, we make the looping for code as inner loop.

We loop again inner loop as much as N times to produce output like stage 2. Then we need to add an outer loop (outer loop)

In [12]:
```java
// Write the code for Experiment 1 Step 6 (combine it with the inner loop in step 4)
import java.util.Scanner;

int N;
Scanner sc = new Scanner(System.in);
System.out.print("Enter the value of N : ");
N = sc.nextInt();

for(int i=0; i<=N; i++){
    System.out.print("*");
}
for(int outer = 1; outer <= N; outer++){
    // Inner Loop
}
```

```
Enter the value of N : 4
*****
```

Question Experiment 1

Question

1. Does combining the *inner loop* and *outer loop* as in step 5 above produce *output* as shown in step 1?
2. If not, please modify the program code so that it produces output that matches the image in step 2?

Answer

1. Yes. Combining the inner loop and outer loop as in step 5 produces the same output as step 1
2. The answer is yes

The modify Program

In [2]:
```java
// Write Experiment 1 program code, which you think is correct
import java.util.Scanner;
int N;
Scanner sc = new Scanner(System.in);
System.out.print("Enter the value of N : ");
N = sc.nextInt();

for(int i=0; i<=N; i++){
    for(int j=0; j<=N; j++){
            System.out.print(" *");
    }
    System.out.println(" ");
}
```

```
Enter the value of N : 5
 * * * * * *
 * * * * * *
 * * * * * *
 * * * * * *
 * * * * * *
 * * * * * *
```

Experiment 2

In the 2nd experiment, an equivalent triangle * experiment with a height of N will be carried out. Suppose N is entered 5, then the results are as shown below

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

Because the program requires input from the keyboard, it is necessary to import the Scanner class

Type the program code below

In [14]:
```
// Write Experiment Code 2 Step 3 above
Scanner sc = new Scanner(System.in);
System.out.print("Enter the value of N : ");
N = sc.nextInt();
int i=0;
while(i<=N){
    int j=0;
    while(j<i){
        System.out.print("*");
        j++;
    }
    i++;
}
```

```
Enter the value of N : 5
***************
```

Question Experiment 2

Question

1. Notice, does the resulting output with a value of N = 5 match the display as in stage 1 (Experiment 2)?
2. If it doesn't fit, which parts should be corrected/added? Describe any parts that need to be improved/added.

Answer

1. Yes the resulting output with a value of N=5 match to the display of stage 1 in experiment 2
2. the part to add is System.out.println(""); under i++;

The modify program :

In [3]:
```
// Write Experiment 2 program code, which you think is correct
Scanner sc = new Scanner(System.in);
System.out.print("Enter the value of N : ");
int N = sc.nextInt();
int i=0;
while(i<=N){
    int j=0;
    while(j<i){
        System.out.print("*");
        j++;
    }
    i++;
    System.out.println("");
}
```

```
Enter the value of N : 5

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

Experiment 3

In the 3rd experiment, an equivalent triangle with a height of N will be conducted. Suppose N is entered 5, then the results are as follows

```
1
22
333
4444
55555
```

Because the program requires input from the keyboard, it is necessary to import the Scanner class

Type the program code below

In [16]:
```
// Write Experiment 3 Step 3 code above, here
import java.util.Scanner;

Scanner input = new Scanner(System.in);

System.out.print("Enter the value of N : ");
int N = input.nextInt();

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

```
Enter the value of N : 8
1
12
123
1234
12345
123456
1234567
12345678
```

Question Experiment 3

Question

1. Does the above program code produce the expected *output*?
2. If not, which program code should be modified? Explain

Answer

1. No, it doesn't show the expected result as the output in stage 1
2. The program that must be changed is to change System.out.print(j); variable j becomes i like this System.out.print(i)

The Modify Program :

In [18]:
```
// Write Experiment 3 program code, which you think is correct
import java.util.Scanner;

Scanner input = new Scanner(System.in);

System.out.print("Enter the value of N : ");
int N = input.nextInt();

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

```
Enter the value of N : 5
1
22
333
4444
55555
```

Experiment 4

In Experiment 4, we will learn to code to guess numbers using nested loops.

In this experiment we use the Scanner library to capture input from the keyboard and Random to generate random numbers

Type and understand the program code below

In [*]:
```
// Write the code for Experiment 4 Step 3 above, here
import java.util.Scanner;
import java.util.Random;

Random random = new Random();
Scanner input = new Scanner(System.in);
char menu = 'y';

do{
    int number = random.nextInt(10)+1;
    boolean success = false;

    do{
        System.out.print("Guess the number (1-10) : ");
        int answer = input.nextInt();
        input.nextLine();

        if(answer == number){
        System.out.println("Yay, Your guess is correct... Congratulation !");
        success = true;
        }
 }while(!success);

System.out.print("Do you want to repeat the game (Y/y)? ");
    menu = input.nextLine().charAt(0);
} while(menu =='y'|| menu == 'Y');
```

```
Guess the number (1-10) : 9
Guess the number (1-10) : 8
Guess the number (1-10) : 7
Guess the number (1-10) : 6
Guess the number (1-10) : 5
Guess the number (1-10) : 4
Guess the number (1-10) : 10
Yay, Your guess is correct... Congratulation !
Do you want to repeat the game (Y/y)? y
Guess the number (1-10) :
```

Question Experiment 4

Question

1. Explain the flow of the program above!
2. What should be done to discontinue (not repeat) the game?
3. Modify the above program, so that it can display information about:
   A. input the guess value entered by the user whether it is smaller or greater than the random value!
   B. Stop the nested loop if the user fails to guess the number up to 10 times, and give the message "Sorry you failed to guess the number 10 times"

Answer

1. The first step to make Scanner and Random. Then create a 'y' character menu then run a do loop. The introduction uses do and in it there is an int number = random for the answer key. Therefore it is necessary to add a boolean to determine whether the statement is true or false, and do it again (nested) and guess the number. If done there will be some time as an outerloop.
2. Yes, because you should be given other options such as no to stop the program. Otherwise, the program will continue to run

Modify the above program, so that it can display information about:

A. input the guess value entered by the user whether it is smaller or greater than the random value!

In [*]:
```
/* Answers for Experiment 4 Question 3.A here */
import java.util.Scanner;
import java.util.Random;

Random random = new Random();
Scanner input = new Scanner(System.in);
char menu = 'y';

do{
    int number = random.nextInt(10)+1;
    boolean success = false;

    do{
        System.out.print("Guess the number (1-10) : ");
        int answer = input.nextInt();
        input.nextLine();

        if(answer == number){
        System.out.println("Yay, Your guess is correct... Congratulation !");
        success = true;
        }else if (answer > number){
            System.out.println("Your guess number is greater");
        }else if (answer < number){
            System.out.println("Your guess number is smaller");
        }
    }while(!success);

    System.out.print("Do you want to repeat the game (Y/y)? ");
    menu = input.nextLine().charAt(0);
} while(menu =='y'|| menu == 'Y');
```

```
Guess the number (1-10) : 3
Your guess number is smaller
Guess the number (1-10) : 4
Yay, Your guess is correct... Congratulation !
Do you want to repeat the game (Y/y)? y
Guess the number (1-10) : 6
Your guess number is smaller
Guess the number (1-10) : 3
Your guess number is smaller
Guess the number (1-10) : 2
Your guess number is smaller
Guess the number (1-10) : 8
Yay, Your guess is correct... Congratulation !
Do you want to repeat the game (Y/y)?
```

B. Stop the nested loop if the user fails to guess the number up to 10 times, and give the message "Sorry you failed to guess the number 10 times"

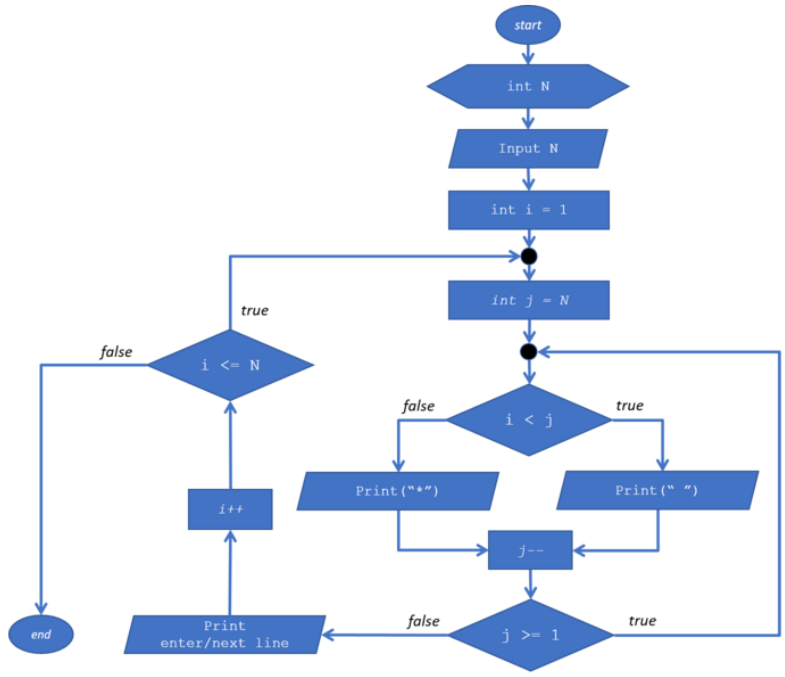
In [2]:
```
/* Answers to Experiment 4 Question 3.B here */
import java.util.Scanner;
import java.util.Random;

Random random = new Random();
Scanner input = new Scanner(System.in);
char menu = 'y';
char menu = 'n';
int x=0;

do{
    int number = random.nextInt(10)+1;
    boolean success = false;

    do{
        System.out.print("Guess the number (1-10) : ");
        int answer = input.nextInt();
        input.nextLine();

        if(answer == number){
        System.out.println("Yay, Your guess is correct... Congratulation !");
        success = true;
        }else if (answer > number){
            System.out.println("Your guess number is greater");
        }else if (answer < number){
            System.out.println("Your guess number is smaller");
        }
        x++;
        if(x>=10){
            System.out.println("Sorry you failed to guess the number 10 times");
            success = true;
        }
     }while(!success);

    System.out.print("Do you want to repeat the game (Y/y) if not type (N/n)? ");
    menu = input.nextLine().charAt(0);
} while(menu =='y'|| menu == 'Y');
} while(menu =='n'|| menu == 'N');
```

```
Guess the number (1-10) : 5
Your guess number is smaller
```

```
Guess the number (1-10) : 5
Your guess number is smaller
Guess the number (1-10) : 5
Your guess number is smaller
Guess the number (1-10) : 5
Your guess number is smaller
Sorry you failed to guess the number 10 times
Do you want to repeat the game (Y/y) if not type (N/n)? n
```

Task

1. Make a program that according to the flowchart below



The program :

```
In [4]: /* Answer to Question 1 here */
Scanner sc = new Scanner(System.in);
System.out.print("Enter Value N : ");
int N = sc.nextInt();
int j = N;
       for (int i = 1; i <= j; i++){
           for (int j = N-1; j >= i; j--) {
               System.out.print(' ');
           }
           for (int j = 1; j <= i; j++){
               System.out.print('*');
           }
           System.out.println();
       }
```

```
Enter Value N : 5
    *
   **
  ***
 ****
*****
```

2. Write a program to print a rectangular display of numbers as below based on input from keyboard N (minimum N value 3). Example N = 3, and N = 5

In [8]:
```
/* Answer to Question 2 here */
import java.util.Scanner;
Scanner in = new Scanner(System.in);
System.out.print("Enter Value N : ");
int n = in.nextInt();
if(n >= 3){
    for(int i=0;i<n;i++){
        System.out.print(n);
    }
    System.out.println();
    for(int i=0;i<n-2;i++){
        System.out.print(n);
        for(int j=0;j<n-2;j++){
            System.out.print(" ");
        }
        System.out.println(n);
    }
    for (int i=0;i<n;i++){
        System.out.print(n);
    }
    System.out.println("");
}else{
    System.out.println("Minimum N value 3");
}
```

```
Enter Value N : 3
333
3 3
333
```

3. Write a program to print a pyramid display * as shown below, the height of the pyramid based on the input from *keyboard* N (minimum N value 3). Example N = 3, and N = 5

In [2]:
```
/* Answer to Question 3 here */
import java.util.Scanner;
Scanner sc = new Scanner(System.in);
int N;
System.out.print("Enter the N value :");
N = sc.nextInt();
for(int i=1; i<=N; i++) {
 for(int j=N; j>i; j--) {
 System.out.print(" ");
 }
 for(int h=1; h<=i; h++) {
 System.out.print("* ");
 }
 System.out.println();
}
 System.out.println();
```

```
Enter the N value :5
    *
   * *
  * * *
 * * * *
* * * * *
```