Loops

Repetitions: Loops

- A loop is a sequence of instruction s that is continually repeated until a certain condition is reached.
- The statement may be repeated
  - For a specific number of items
  - For an indeterminate number of times, depending on the truth or falsity of some condition.

Loops

- C++ provides three types of loops

for loops (1-n times)

- Repeat a section of code known number of times

while loops (0 –more times)

- Loop is used to repeat a specific block of code an **unknown** number of times

do while loops (1 –more times)

- A do while loop is a control flow statement that executes a block of code at least once, and then repeatedly executes the block

Repeat some work

- **Do some repeated work**
  - **Initialization** (Start number)
  - **Condition** (do repeat action until satisfy some condition)
  - **Update** (Next Value)
- **Example**
  - **Initialization** Startwith 1
  - **Condition** Count up to 50
  - **Update** Count 1 by 1

While Loop

- Allows the repetition of a statement based on the truth value of a condition
- Can run 0 to infinite times

```
while (condition)
{
    statement(s)
}
```

Exercise 6.3

1. Write a c++ program to print the following figure

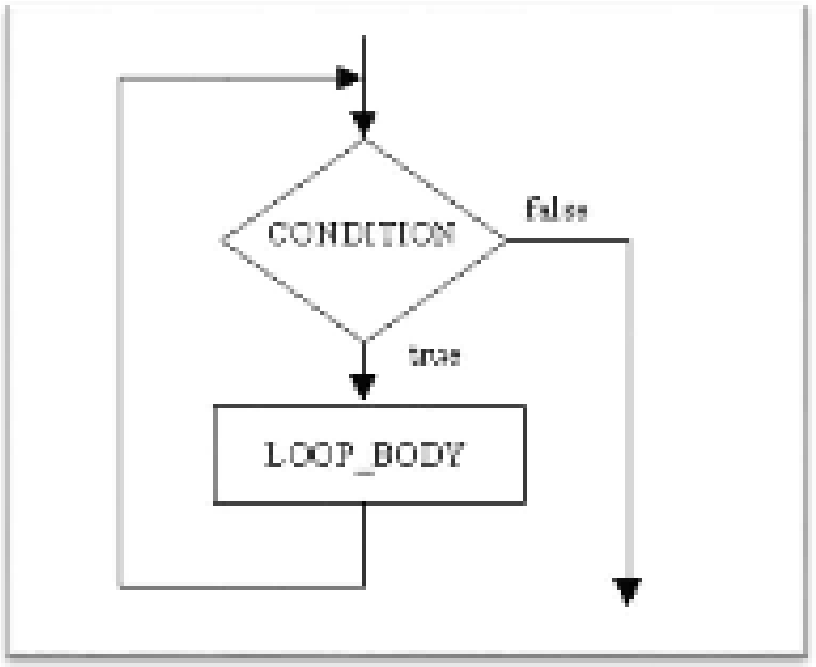
a)
```
*
**
***
****
*****
```

b)
```
1  12
   123
   1234
   12345
```

While Loop

- Syntax

```
while (Condition)
 {
   statement(s)
 }
```



- Example

```
int num=1;

while (num <=10)
{
    cout << num<<endl;
    num++;
}
```

Initialization

Condition

Update

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

Do-while Loop

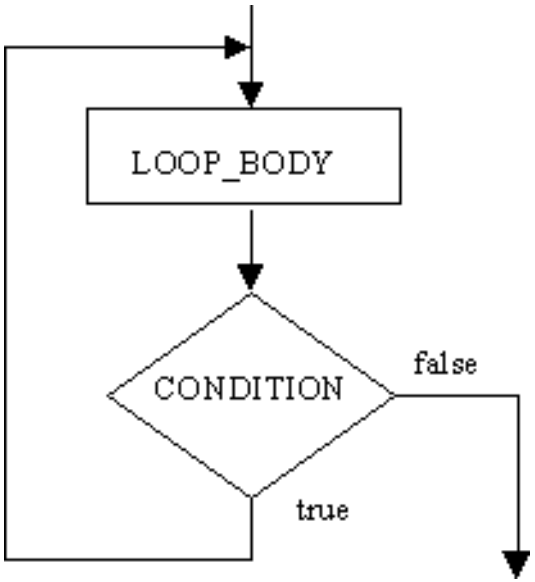
- do…while loop also depends on a condition, but unlike while loop, its condition is evaluated at the bottom of the loop, after the body has already executed.

```
do
{
    statement(s)
}
while (condition);
```

Do-while Loop

- Syntax

```
do
 {
      statement(s
  }
  while (condition);
```



Example

```
int num = 1;
do
{
cout << "Number is: "<< num << endl;
num++;
}
while (num <= 10);
```

Initializatio
n

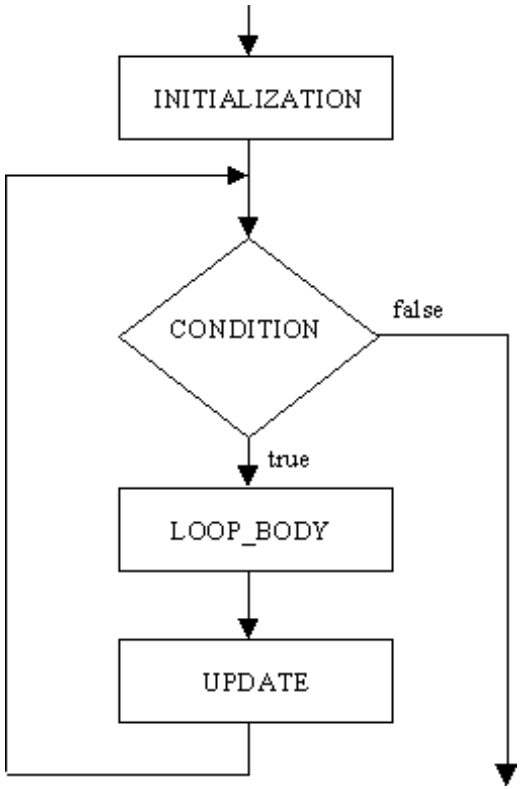
Updat
e

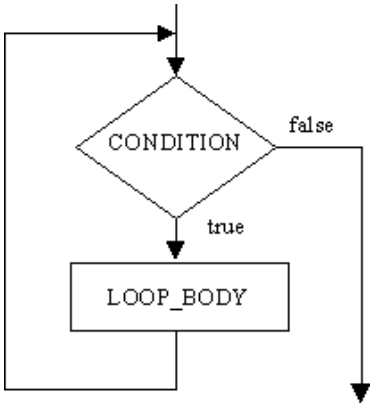
Condition

```
Number is: 1
Number is: 2
Number is: 3
Number is: 4
Number is: 5
Number is: 6
Number is: 7
Number is: 8
Number is: 9
Number is: 10
```

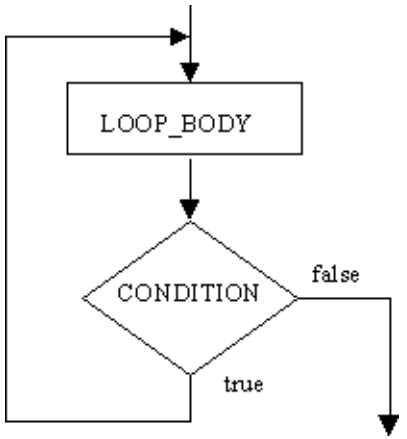
Loops comparison

For while





do-while



Loops comparison

```
for(int i = 1 ; i <11 ; i ++)
{
    cout << "Value "<< i << endl;
}
```

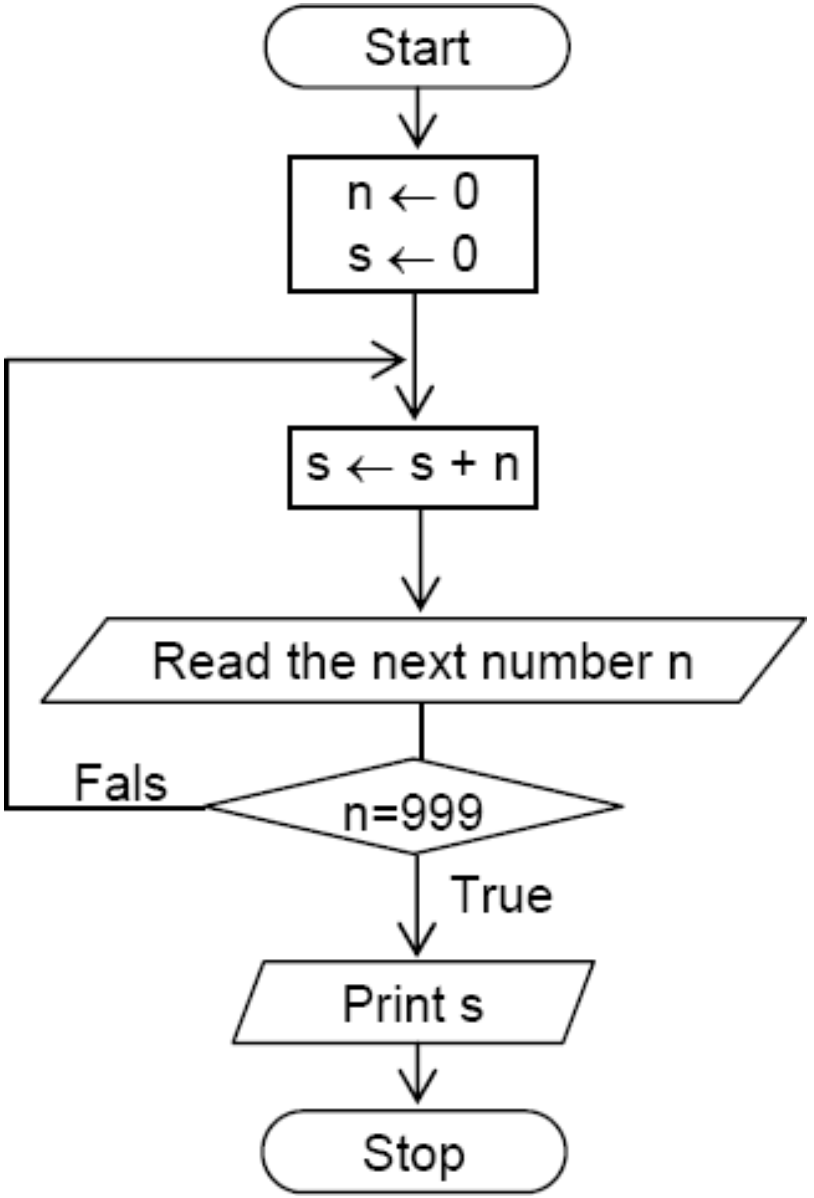
```
int num=1;

while (num <=10)
{
    cout << num<<endl;
    num++;
}
```

```
int num = 1;
do
{
cout << num << endl;
num++;
}
while (num <= 10);
```

Exercise 6.6

Accept numbers until the user enters a 999 and output the average of the given numbers



Exercise 6.8

Write a C++ program to read **N** number of integers and find the total and average.

- **N** is an input 1, 2, 3….. **N**
- Use for, while and do-while loops
- Draw 3 flow chart for the above 3 programs