Lecture 5

1- Examples of order evaluation:

Note

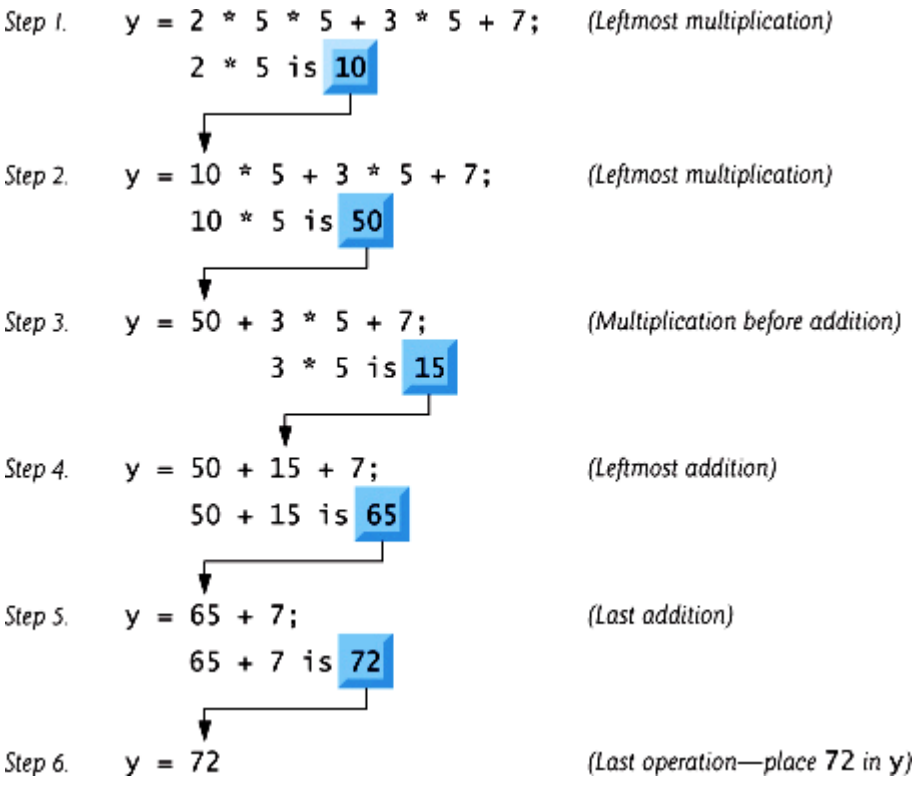
- operator precedence

  ( )

  *, /, % (left to right)

  +, - (left to right)

for example :-



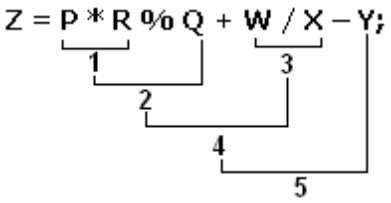
Example 1:

State the order of evaluation for the following expression:

Z = P * R % Q + W / X – Y;

Solution:

1. *
2. %
3. /
4. +



Example4: - Write C++ program to perform the above equation:

```
#include<iostream>

#include<conio>

void main( )

{

int Z, P, R, Q, W, X, Y;

cout << "enter P:";

 cin >> P;

cout << "enter R:";

 cin >> R;

cout << "enter Q:";

cin >> Q;

cout << "enter W:";

 cin >> W;
```

```
cout << "enter X:";
 cin >> X;
cout << "enter Y:";
cin >> Y;
Z= P * R % Q + W / X - Y;
cout << "the result="<< Z;
getch();
}
```

2 -The "math.h" Library:

The "math.h" library contains the common mathematical function used in the scientific equations.

Common function from math.h library:	
Mathematical Expression	C++ Expression
e^n	Exp(x)
Log(x)	Log10(x)
Ln(x)	Log(x)
Sin(x)	Sin(x)
x^n	Pow(x,n)
$\sqrt{x}$	Sqrt(x)

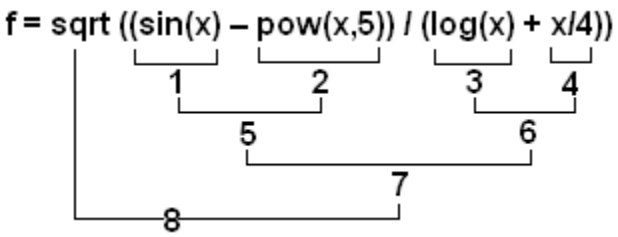
Example 2: Write the following equation as a C++ expression and state the order of evaluation of the binary operators:

$$f = \sqrt{\frac{\sin(x) - x^5}{\ln(x) + \frac{x}{4}}}$$

Solution:

f = sqrt ((sin(x) – pow(x,5)) / (log(x) + x/4))

Order of evaluation:



Example 3: - Write a program to solve the following equation (3x+5y+2x2)

```
#include <iostream>
#include <conio>
#include <math.h>
void main()
{
int x,y;
cout<<"the equation is: 3x+5y+2x2\n";
cout<<"enter the frist number:\t";
 cin>>x;
cout<<"\nenter the second number:";
cin>>y;
cout<<"\n the result is:\t"<<((3*x)+(5*y)+(2*pow(x,2)) );
getch();
 }
```

Exercise:

Write the following equation as a C++ expression and state the order of evaluation of the binary operators:

Solution: ?

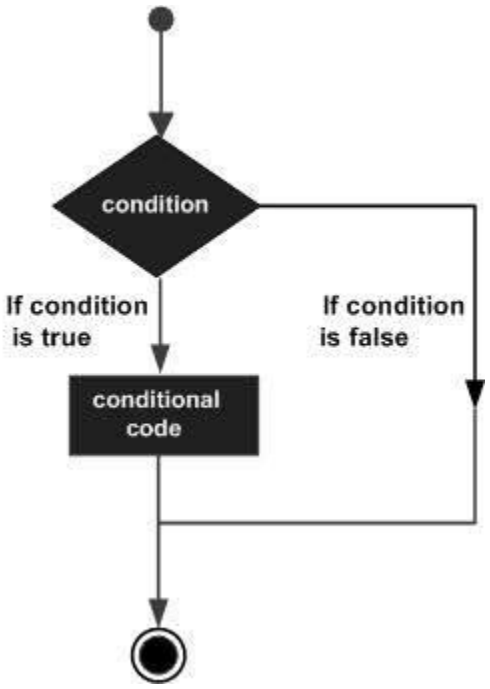
$$Z = \sqrt{\frac{x^2 y - 3\sin(x)}{\tan x^3 + x^3 / y}}$$

Selection Statements:

Conditional expressions are mainly used for decision making. C++ provides multiple selection structures: **if**, **if/else**, **else if**, **nested if** and **switch**.

1. The Single If Statement Structure:

The IF statement is used to express conditional expression. If the given condition is true then it will execute the statements; otherwise it will execute the optional statements.



For example :-

```
if ( avrg >= 3.5 )
cout << “good”;
```

Example 2:

```
if ( x > 0.0 )
sum += x;
```

Example 3:

```
cin >> num;
if ( num == 0 )
zcount = zcount + 1;
```

Example1:-Write a C++ program to read any two numbers and print the largest value of it:

```
#include<iostream>
#include <conio>
void main( )
{
Int  x,y;
Cout<<”Enter any two numbers\n”;
Cin>>x>>y;
If (x>y)
Cout << “largest value is”<<x<<endl;
getch();
}
```

Example2: Write a program to read any number and display the message "x is positive" on the screen if the number is positive.

```
# include <iostream>
#include <conio>
```

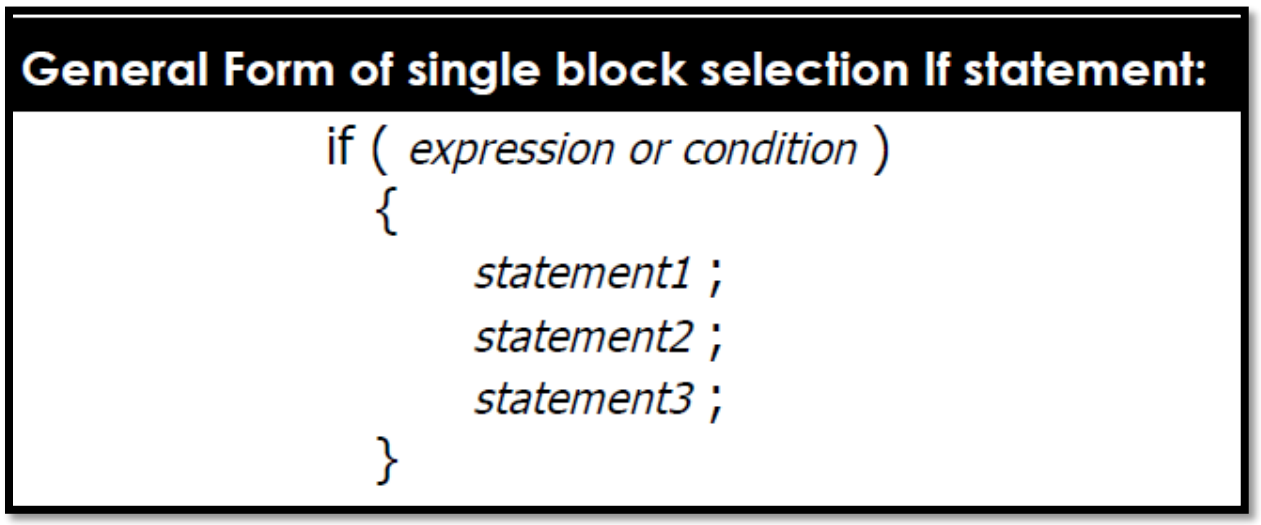
```
main ( )
{
int x ;
cin >> x ;
if (x > 0)
cout << "x is positive" << endl;
getch();
}
```

Example 3: Write a program to read number represent the marks for any student and display the message "Outstanding Student" on the screen if the marks is greater than 90.

```
# include <iostream>
#include <conio>
main ( )
{
float marks;
cout<<"Enter the marks ";
cin>>marks;
if(marks > 90)
cout<<"Outstanding Student "<<"\n";
getch();
}
```

2. The Single Block If Statement Structure :

The block IF statement are enclosed in ({) and (}) to group declaration and statements into a compound statement or a block. These blocks are always considered as a single statement. The structure is:



Example1:-Write a C++ program to read a number and check if it's positive, if it's so print it, add it to a total, and decrement it by 2:

```
#include<iostream>
#include <conio>
void main( )
{
int num, total=0;
cin >> num;
if ( num >= 0 )
{
 cout << num <<" is a positive";
total += num;
num = num – 2;
```

```
}
getch();
 }
```