**Relational operators**

**Exercise 1**

|  |  |
| --- | --- |
| (7 == 5) // evaluates to . . .  (5 > 4) // evaluates to . . .  (3 != 2) // evaluates to . . .  (6 >= 6) // evaluates to . . .  (5 < 5) // evaluates to . . . |  |

Verify your answers using cout statement

**if Statement**

**Example 2**

#include <iostream>

using namespace std;

int main() // Most important part of the program!

{

int age; // Need a variable...

cout << "Please input your age: "; // Asks for age

cin >> age; // The input is put in age

cin.ignore(); // Throw away enter

if (age < 100) { // If the age is less than 100

cout << "You are pretty young!\n"; // Just to show you it works...

}

cin.get();

}

**Comparing Floating-Point Numbers**

#include <cmath>

#include <iostream>

using namespace std;

int main()

{

double a = 1.5;

double b = 1.5;

a += 1.0e-16;

if (a == b)

cout << "Both a and b are the same. \n";

if (a != b)

cout << "Both a and b are not the same. \n";

cin.get();

return 0;

}

**Expanding the if statement**

if (x == 100)

{

cout << "x is ";

cout << x;

}

**The if/else statement**

#include <cmath>

#include <iostream>

using namespace std;

int main()

{

double a = 1.5;

double b = 1.5;

a += 1.0e-16;

if (a == b)

cout << "Both a and b are the same. \n";

else

cout << "Both a and b are not the same. \n";

cin.get();

return 0;

}

**Nested if Statements**

#include <iostream>

#include <cstdlib>

using namespace std;

int main()

{

int magic;

int guess;

magic = rand(); // get a random number

cout << "Enter your guess: ";

cin >> guess;

if (guess == magic) {

cout << "Right";

cout << magic << " is the magic number.\n";

}

else {

cout << "...Sorry, you're wrong.";

if (guess > magic)

cout << " Your guess is too high.\n";

else cout << " Your guess is too low.\n";

}

cin.ignore();

cin.get();

return 0;

}

**The if/else if statement**

#include <iostream>

using namespace std;

int main() {

int hours;

cout << "how many hours have you worked this week ?" << endl;

cin >> hours;

if (hours >= 41)

{

cout << "you have worked 40 rregular hours" << endl;

cout << "you have worked "<< hours - 40 <<" overtime hours" << endl;

}

else if (hours >= 31)

{

cout << "you have worked "<<hours<<" rregular hours" << endl;

cout << "you have worked " << 40 - hours

<< " hours. You will get 75% of the regular payment" << endl;

}

else if (hours >= 21)

{

cout << "you have worked " << hours << " rregular hours" << endl;

cout << "you will be payed as partime job" << endl;

}

else

{

cout << "You can not be payed" << endl;

}

return 0;

}

**Flags**

#include <iostream>

#include <cstdlib>

using namespace std;

int main()

{

bool status;

int work\_years;

cout << "Enter your work years" << endl;

cin >> work\_years;

if (work\_years >= 15)

status = true;

else

status = false;

if (status)

{

cout << "you are eligible to get retirement payment " << endl;

if (work\_years - 15 >= 10)

cout << "your retirement payment is $1500 " << endl;

else

cout << "your retirement payment is $1000 " << endl;

}

else

{

cout << "you are not eligible to get retirement payment " << endl;

}

cin.ignore();

cin.get();

return 0;

}

**Example**

The program will prompt the user to input the values of a, b, and c. It then computes the real roots of the equation based on the following rules:   
-if a and b are zero=> no solution   
-if a is zero=>one root (-c/b)   
-if b2-4ac is negative=>no roots

The roots can be computed using the following formula:   
x1=-b+(b2-4ac)1/2/2a   
x=-b-(b2-4ac)1/2/2a

**Solution:**

#include <cstdlib>   
#include <iostream>   
#include<iomanip>   
#include<cmath>   
    
using namespace std;   
    
int main(int argc, char \*argv[])   
{   
   float a;   
   float b;   
   float c;   
   float delta;   
    
   cout<<"Enter values of a b c separated by space:";   
   cin>>a>>b>>c;   
   if(a==0 && b==0)

cout<<"No root";   
   else if(a==0)

cout<<"The equation has only one root:"<<-b/c;   
   else {   
        delta=b\*b-4\*a\*c;   
        if(delta<0)

cout<<"No root";   
        else

cout<<"The equation has two roots:"<<"x="

<<-b+sqrt(b\*b-4\*a\*c)/(2\*a)<<",x1="<<-b-sqrt(b\*b-4\*a\*c)/(2\*a);   
   }                 
     
   cout<<"\n";   
   cin.ignore();

cin.getc();   
   return 0;   
}

**Comparing Characters and Strings**

#include <iostream>

using namespace std;

int main() {

char ch;

cout << "Enter a character\n";

ch = cin.get();

if (ch >= '1' && ch < '9')

cout << "you entered a digit\n";

else if (ch >= 'A' && ch < 'Z')

cout << "you entered a capital letter\n";

else if (ch >= 'a' && ch < 'z')

cout << "you entered a small letter\n";

else

cout << "This is not a digit or letter\n";

cin.ignore();

cin.get();

return 0;

}

#include <iostream>

#include <string>

using namespace std;

int main() {

string name;

string name1;

string stringconcat;

cout << "Enter the first name\n";

getline(cin,name);

cout << "Enter the second name\n";

getline(cin, name1);

if (name < name1)

stringconcat = name+ " " + name1;

else

stringconcat = name1 + " " + name;

cout << stringconcat << endl;

cin.ignore();

cin.get();

return 0;

}

**The Conditional Operator**

#include <iostream>

using namespace std;

int main ()

{

// Local variable declaration:

int x, y = 10;

x = (y < 10) ? 30 : 40;

cout << "value of x: " << x << endl;

cin.ignore();

cin.get();

return 0;

}

**switch** Statement

#include <iostream>

using namespace std;

int main ()

{

// local variable declaration:

char grade = 'D';

switch(grade)

{

case 'A' :

cout << "Excellent!" << endl;

break;

case 'B' :

case 'C' :

cout << "Well done" << endl;

break;

case 'D' :

cout << "You passed" << endl;

break;

case 'F' :

cout << "Better try again" << endl;

break;

default :

cout << "Invalid grade" << endl;

}

cout << "Your grade is " << grade << endl;

cin.ignore();

cin.get();

return 0;

}