This is extra-credit homework to get more practice with programming, small steps at a time. Odd-numbered problems have answers on the next page, while you get credit for any even-numbered answers turned in. Practice doing both even and odd problems, using the answers as a guide afterward.

First, create a basic C++ program:

```
#include <iostream>
#include <string>
using namespace std;

int main()
{
    return 0;
}
```

For the turn-in problems (even numbered), you can have one right after another in the same program. Use a comment to specify which part of the code belongs to which problem. Example:

```
#include <iostream>
#include <string>
using namespace std;

int main()
{
    // Question 1.
    int number;

    // Question 2.
    char letter;

    return 0;
}
```

Submit the .cpp (C++ Source) file once you are done.

Questions: Boolean Expressions

Points possible: 8

1.	Write a boolean expression that signifies “x is greater than y”.
2.	Write a boolean expression that signifies “x is less than y”.
3.	Write a boolean expression that signifies “x is greater than or equal to y”.
4.	Write a boolean expression that signifies “x is less than or equal to y”.
5.	Write a boolean expression that signifies “x is equal to y”.
6.	Write a boolean expression that signifies “a is equal to b”.
7.	Write a boolean expression that signifies “x is not equal to y”.
8.	Write a boolean expression that signifies “y is not equal to z”.
9.	Write a boolean expression that signifies “x is greater than y or y is greater than z”.
10.	Write a boolean expression that signifies “x is less than y or y is less than z”.
11.	Write a boolean expression that signifies “x is equal to y and x is equal to z”.
12.	Write a boolean expression that signifies “x is not equal to y and y is not equal to z”.
13.	Write a boolean expression that signifies “x is true”.
14.	Write a boolean expression that signifies “x is false”.
15.	Write a boolean expression that signifies “x is true and y is false”.
16.	Write a boolean expression that signifies “x is true or y is false”.

Answers: Boolean Expressions

1.	`x > y`
3.	`x >= y`
5.	`x == y` In C++, to ask “are these two things equal”, we use the **equal to** operator **==.** If you use just one equal sign, that means it is an **assignment statement.**
7.	`x != y` != is the **not equal to** operator.
9.	`x > y || y > z`
11.	`x == y && x == z`
13.	`x == true`
15.	`x == true && y == false`

Questions: If Statements

Points possible: 3

17.	Declare an integer variable called **age**. Get the user input and store it in **age**. If **age** is greater than or equal to 21, output the message **Beer!**
18.	Declare an integer variable called **year**. Get the user input and store it in **year**. If **year** is greater than 1999, output the message **Y2K**
19.	Declare a character variable named **choice**. Output the text **Do you want to quit Y or N:** Get the user input and store it in **choice**. If **choice** is equal to **Y**, output the message **Bye!**
20.	Declare a character variable named **direction**. Output the text **Choose a direction N, E, S, W:** Get the user input and store it in **direction**. If **direction** is equal to **N**, output the message **North!**
21.	Declare a string variable named **operation**. Output the text **Do you want to ADD or DIVIDE?** Get the user input and store it in **operation**. If **operation** is equal to **ADD**, output the value of **2 + 2**.
22.	Declare a string variable named **greet**. Output the text **Hello or Goodbye?** Get the user input and store it in **greet**. If **greet** is equal to **Hello**, output the value of **Hello World!**

Answers: If Statements

17.

```
int age;
cout << "Age: ";
cin >> age;
if ( age > 21 )
{
    cout << "Beer!" << endl;
}
```

19.

```
char choice;
cout << "Do you want to quit Y or N: ";
cin >> choice;
if ( choice == 'Y' )
{
    cout << "Bye!" << endl;
}
```

Remember that the value of a **char** must be stored within two single-quotes.

21.

```
string operation;
cout <<  "Do you want to ADD or DIVIDE? ";
cin >> operation;
if ( operation == "ADD" )
{
    cout << 2 + 2 << endl;
}
```

Remember that the value of a **string** must be stored within two double-quotes.

Questions: If / Else Statements

Points possible: 3

23.	Declare an integer variable called **age2**. Get the user input and store it in **age2**. If **age2** is greater than or equal to 21, output the message **Beer!** Otherwise, output the message **Water!**
24.	Declare an integer variable called **year2**. Get the user input and store it in **year2**. If **year2** is greater than 1999, output the message **Y2K**. Otherwise, output the message **Computers are safe!**
25.	Declare a character variable named **choice2**. Output the text **Do you want to quit Y or N:** Get the user input and store it in **choice2**. If **choice2** is equal to **Y**, output the message **Bye!** Otherwise, output the message **Welcome Back!**
26.	Declare a string variable named **greet2**. Output the text **Hello or Goodbye?** Get the user input and store it in **greet2**. If **greet2** is equal to **Hello**, output the value of **Hello World!** Otherwise, output the value **Goodbye World!**
27.	Declare a float variable called **change**. Get the user input and store it in **change**. If **change** is less than 0, output the message **Negative number, less than zero** Otherwise, output the message **Positive number or equal to zero.**
28.	Declare a float variable called **money**. Get the user input and store it in **money**. If **money** is greater than 0, output the message **Positive number, greater than zero** Otherwise, output the message **Negative number or equal to zero.**

Answers: If / Else Statements

23.

```
int age2;
cout << "Age? ";
cin >> age2;
if ( age2 > 21 )
{
    cout << "Beer!" << endl;
}
else
{
    cout << "Water!" << endl;
}
```

25.

```
char choice2;
cout << "Do you want to quit Y or N: ";
cin >> choice2;
if ( choice2 == 'Y' )
{
    cout << "Bye!" << endl;
}
else
{
    cout << "Welcome Back!" << endl;
}
```

27

```
float change;
cout << "Change? ";
cin >> change;
if ( change < 0 )
{
    cout << "Negative number, less than zero" << endl;
}
else
{
    cout << "Positive number, or equal to zero" << endl;
}
```

If the question relating to the **if statement** (here, is change less than 0?) is **false**, that automatically means that the opposite is true (change is either greater than 0, or equal to 0.)

Questions: If / Else If / Else Statements

Points possible: 2

29.	Create a string variable named **direction**. Output the message **N, E, S, or W:** Get the user's input and store it in the **direction** variable. If direction is **N**, then output **North**. Otherwise, if direction is **S**, then output **South**. Otherwise, if direction is **E**, then output **East**. Otherwise, if direction is **W** then output **West**. If none of these are true, output **Invalid Direction.**
30.	Create a string variable named **day**. Output the message **M, T, W, R, F:** Get the user's input and store it in the **day** variable. If day is M, output **Monday**. If day is T, output **Tuesday**. If day is W, output **Wednesday**. If day is R, output **Thursday**. If day is F, output **Friday**. If none of these are true, output **Invalid Day.**
31.	Create an integer variable named **year3**. Have the user enter the year. If the year is between 1946 and 1954, output **Baby Boom**. If the year is between 1966 and 1976, output **GenX** If the year is between 1977 and 1994, output **Millennium** If the year is greater than or equal to 1995, output **GenZ**
32.	Create an integer variable named **year4**. Have the user enter the year. If the year is between 1914 and 1918, output **World War 1** If the year is between 1939 and 1945, output **World War 2** If the year is between 1955 and 1975, output **Vietnam War**

Answers: If / Else If / Else Statements

29.

```
string direction;
cout << "N, E, S, or W: ";
cin >> direction;
if      ( direction == "N" ) { cout << "North"; }
else if ( direction == "S" ) { cout << "South"; }
else if ( direction == "E" ) { cout << "East"; }
else if ( direction == "W" ) { cout << "West"; }
else
{
    cout << "Invalid direction";
}
```

31.

```
int year3;
cout << "Year: ";
cin >> year3;
if      ( year3 => 1946 && year3 <= 1954 )
{
    cout << "Baby Boom";
}
else if ( year3 >= 1966 && year3 <= 1976 )
{
    cout << "GenX";
}
else if ( year3 >= 1977 && year3 <= 1994 )
{
    cout << "Millennium";
}
else if ( year3 >= 1995 )
{
    cout << "GenZ";
}
```