

# Homework 1: Guess the output

```
03_homework1.cpp
1 #include<iostream>
2 using namespace std;
3
4 int main() {
5
6     int a = 10, b = 20, c = 30, d = 40;
7
8     cout << (a + b == c) << "\n";
9     cout << (a + b + c >= 2 * d) << "\n";
10
11     cout << (a > 5 || d < 30) << "\n";
12     cout << (a > 5 && d < 30) << "\n";
13     cout << (a <= b && b <= c) << "\n";
14
15     cout << (a > 5 && d < 30 || c - b == 10) << "\n";
16     cout << (a <= b && b <= c && c <= d) << "\n";
17
18     cout << (a > 5 && d < 30 || c > d || d % 2 == 0) << "\n";
19     cout << (a > 5 && d < 30 || c > d && d % 2 == 0) << "\n";
20
21     cout << ( a == 10 || b != 20 && c != 30 || d != 40) << "\n";
22     cout << ((a == 10 || b != 20) && c != 30 || d != 40) << "\n";
23
24     return 0;
25 }
26
27
```

**The Output :**

1  
0  
1  
0  
1  
1  
1  
1  
1  
1  
1  
0

## Homework 2: Create logic!

- Write a program that reads 3 integers about the class room
  - Number of boys (nb), number of girls (ng), number of teachers (nt)
- Prepare and **print** a boolean variable for these cases:
- nb greater than 25
- ng less than or equal to 30
- nb > 20 and nt > 2 or ng > 30 and nt > 4
- Either nb < 60 or ng < 70
- Neither nb >= 60 nor ng >= 70
- nb is 10 more students than ng
- Difference between nb and ng is more than 10 or nt > 5
- Either **nb is 10 more students than ng** or **ng is 15 more students than nb**

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

int main()
{
    int nb, ng, nt;
    cout << "Enter number of boys, girls, and teachers: ";
    cin >> nb >> ng >> nt;

    bool cnd1 = nb > 25;
    bool cnd2 = ng <= 30;
    bool cnd3 = (nb > 20 && nt > 2) || (ng > 30 && nt > 4);
    bool cnd4 = (nb < 60) || (ng < 70);
    bool cnd5 = !(nb >= 60) && !(ng >= 70);
    bool cnd6 = nb == ng + 10;
    bool cnd7 = (abs(nb - ng) > 10) || (nt > 5);
    bool cnd8 = (nb == ng + 10) || (ng == nb + 15);

    cout << cnd1 << " " << cnd2 << " " << cnd3 << " "
         << cnd4 << " " << cnd5 << " " << cnd6 << " "
         << cnd7 << " " << cnd8 << endl;

    return 0;
}
```

## Homework 3 (optional): Simplify expressions

- For each expression:
  - Write a line of code that evaluate it to see its final value
  - Simplify it step by step to finally be a T or F
- $T \ \&\& \ T \ \&\& \ F \ \&\& \ T$
- $T \ \&\& \ T \ \&\& \ F \ \&\& \ T \ || \ T \ \&\& \ T$
- $T \ \&\& \ T \ \&\& \ T \ \&\& \ T \ || \ T \ \&\& \ (T \ || \ F)$
- $T \ \&\& \ T \ \&\& \ T \ || \ T \ \&\& \ (F \ || \ (T \ \&\& \ (T \ \&\& \ T)))$
- $T \ \&\& \ T \ || \ T \ \&\& \ F \ \&\& \ T \ || \ T \ \&\& \ T \ \&\& \ F \ || \ (T \ \&\& \ (T \ || \ F))$
- $T \ \&\& \ T \ || \ T \ \&\& \ F \ \&\& \ T \ || \ (T \ \&\& \ T \ \&\& \ F \ || \ (T \ \&\& \ (T \ || \ F)))$
- $(T \ \&\& \ T \ || \ T \ \&\& \ F \ \&\& \ T \ || \ T) \ \&\& \ T \ \&\& \ F \ || \ (T \ \&\& \ (T \ || \ F))$
- $T \ \&\& \ T \ || \ T \ \&\& \ (F \ \&\& \ T \ || \ T \ \&\& \ T) \ \&\& \ F \ || \ (T \ \&\& \ (T \ || \ F))$

$T \ \&\& \ T \ \&\& \ F \ \&\& \ T \rightarrow F$

$T \ \&\& \ T \ \&\& \ F \ \&\& \ T \ || \ T \ \&\& \ T \rightarrow T$

$T \ \&\& \ T \ \&\& \ T \ \&\& \ T \ || \ T \ \&\& \ T \ || \ F \rightarrow T$

$T \ \&\& \ T \ \&\& \ T \ || \ T \ \&\& \ F \ \&\& \ T \ || \ T \ \&\& \ T \ \&\& \ F \ || \ T \ \&\& \ F \rightarrow T$

$T \ \&\& \ T \ || \ T \ \&\& \ F \ \&\& \ T \ || \ T \ \&\& \ T \ \&\& \ F \ || \ T \ \&\& \ F \rightarrow T$

$T \ \&\& \ T \ || \ T \ \&\& \ F \ \&\& \ T \ || \ T \ \&\& \ T \ \&\& \ F \ || \ T \ \&\& \ F \rightarrow T$