Selection Statements & Logical Operators

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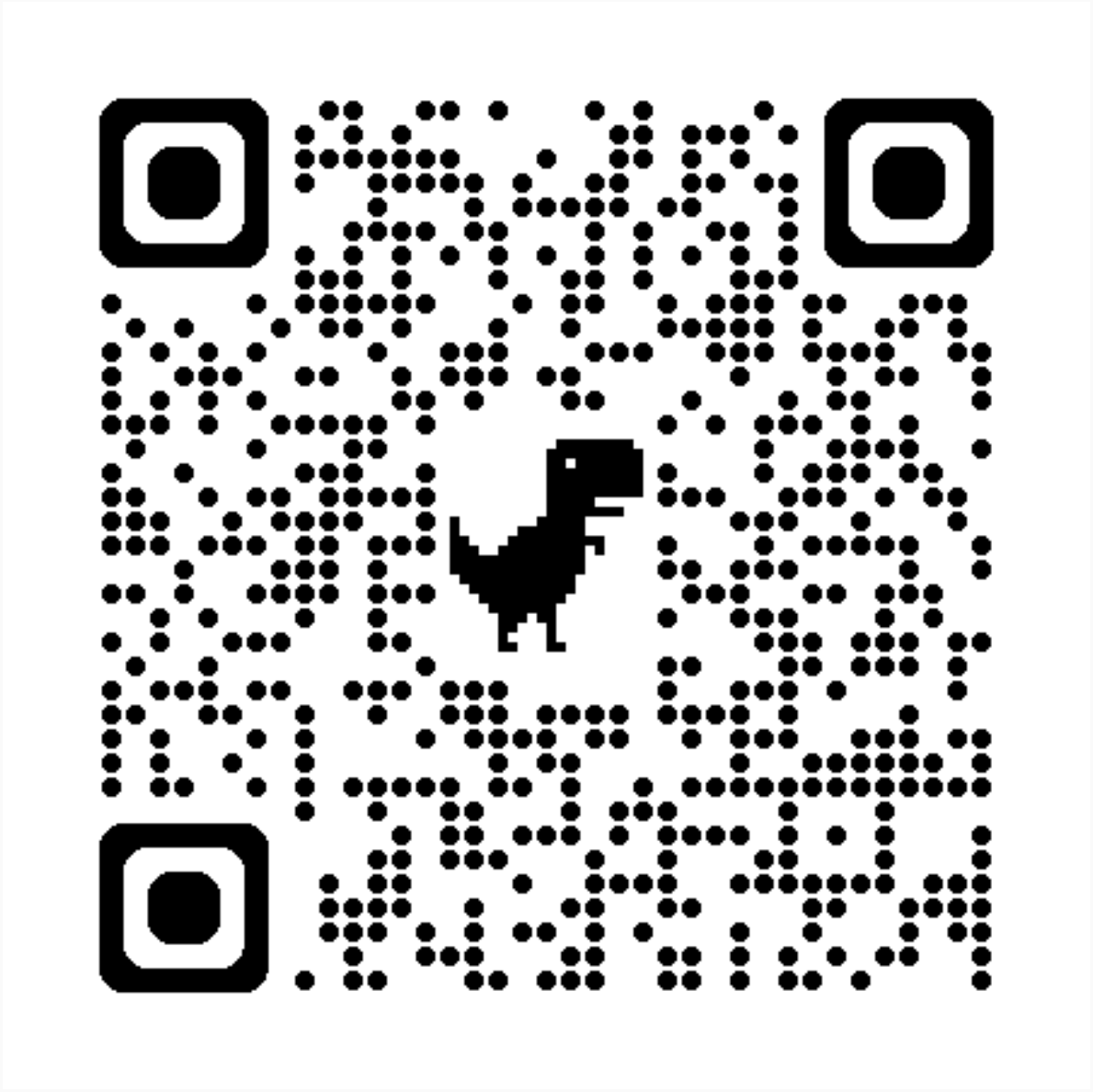
week 2

Course Materials



Outline

1. Recap

2. Force data type casting

3. Selection Statements

Recap

Remember

- Every statement ends with a semicolon **(;)**.
- Programs always start from the main() function.
- All functional code needs to be inside a function.
- All functions must be enclosed in curly braces **{}**.

Basic structure of C++

```cpp
#include <bits/stdc++.h>
using namespace std;

int main() {
    // code here
    return 0;
}
```

Variables Declaration

```
1    int a;
2    double b, pi=3.14;
3    char c='A';
```

Basic Input/Output

```
1    int a, b, c;
2    cin >>a>>b>>c;
3    cout<<"The result of a*10 is"<<a*10<<endl;
```

What's the value of each variable?

```
1  int a, b;
2  char c;
3  //input: 10+5
4  cin >>a>>c>>b;
```

A little tip

The result is `a=10, b=5, c='+'`

In C++, the input stream will read the whole input until it meets a whitespace, newline or another data type.

Therefore, `cin` will read `10` into `a`, then meet the character `'+'` and stop reading for `a`.

Next, `cin` will read `'+'` into `c`, then meet the character `'5'` and stop reading for `c`.

Finally, `cin` will read `5` into `b`.

This is a little tip for you to understand how `cin` works.

Force data type casting

Idea of force data type casting

In C++, we should declare a variable with data type before we utlize it. But what if we assign a value with different data type to it?
In this case, C++ will automatically convert the assigned value to the data type of the variable.
For instance, we declare an integer variable `a`, but we assign a double value `3.14` to it.
In this case, C++ will automatically convert `3.14` to `3` and assign it to `a`.

Conversion rules

- Integer to double: add a decimal point and a zero.
- Double to integer: remove the decimal point and the digits after it.
- Character to integer: convert the character to its ASCII code.
- Integer to character: convert the ASCII code to its corresponding character.

Selection Statements

Preface: How to convert score to GPA?

Following is the GPA conversion table of an university.

Score	Grade	GPA
80-100	A	4.0
70-79	B	2.8
60-69	C	1.5
0-59	F	0.0

Table 1: Grade Conversion Table

Solution without selection statements

With only variable operations, we can do it like this:

```
#include<bits/stdc++.h>
using namespace std;

int main(){
    int score;
    double gpa;
    cin >>score;
    gpa=(score>59)*1.5+(score>69)*1.3+(score>79)*1.2;
    cout<<gpa<<'\n';
}
```