

Lecture 5

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*Any fool can write code that a computer can understand.
Good programmers write code that humans can understand.
- Martin Fowler*

Variables

Three operations are usually performed

- ▶ Declaration (What type of data?)
 - ▶ Compiler will assign adequate memory for the variable based on the datatype.
- ▶ Initialisation (Value of the data to be stored in that variable.)
- ▶ Modification (Operations (if any) on the data stored in the variable.)

Modifying variables

```
int main(){  
    int day;  
    day = 2;  
    cout << day << endl;  
    day = 3;  
    cout << day << endl;  
    return 0;  
}
```

Constant Variables

- ▶ No special datatype for constant variables in C++
- ▶ Declared using `const`
 - ▶ `const int day=2;`
- ▶ Data has to be initialised at the time of declaration.

Operators

- ▶ Unary
 - ▶ Trigonometric operators like `sin()`
- ▶ Binary
 - ▶ Addition (+)
 - ▶ Subtraction (-)
 - ▶ Multiplication (*)
 - ▶ Division (/)
 - ▶ Modulus (%)
- ▶ An operator has input datatype and an output datatype. Behaviour of an operator changes based on the datatype of input and output variables.
- ▶ Example `07-operators.cpp`

Type conversion

- ▶ On assignment of a variable
 - ▶ `int i = 1.234` will result in `i=1`
- ▶ During operations
 - ▶ `9.0/2` will be executed as `9.0/2.0`

Operator precedence

- ▶ $1 + 2 * 3$
- ▶ $(1 + 2) * 3$
- ▶ $1.0 + 3 / 2$
- ▶ $1.0 + 3.0 / 2$
- ▶ $3/2*1$
- ▶ $3/2*1.0$
- ▶ $(3/2)*1.0$
- ▶ $3/(2*1.0)$
- ▶ $3/(2*1)$
- ▶ $3/(1+1.0)$
- ▶ $3/(1+1)$

Collection of data

- ▶ Arrays are used to store a collection of data that is homogeneous (that is of the same datatype)
- ▶ `int day[10]` stores 10 integers in variable `day`
- ▶ Indexing starts from 0. Other languages like Fortran start the indexing from 1
- ▶ First element can be accessed as `day[0]` and the last one can be accessed as `day[9]`

Collection of data

- ▶ Other examples are
 - ▶ `double pressure[10]`
- ▶ Arrays are **mutable**. That means data in an Array can be modified but the datatype of the array is fixed.
- ▶ Lets write a simple program that
 - ▶ Declares an array
 - ▶ Initialises an array
 - ▶ Modifies an array
 - ▶ Displays an array

Lets create a database of student name and marks.