COMP 2006 - Lecture 2

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Types

- Types can possibly be values or operations
- Instances of types are known as objects
- Objects are stored in memory and has a value type

Types	Variable
bool	Truth or false
int	Integer or number
float	Decimal number
string	A word
char	A letter or character
void	empty
double	A decimal number

Boolean

- Booleans can be true or false. Returns 1 for true, 0 for False.

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

int main() {

   bool b = true;
   cout << "The boolean is: " << b << endl;

   return 0;
}
```

Returns
The boolean is: 1

Integer

- An integer type represents a numerical value. No decimals!

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

int main() {

  int a = 100;
  int b = 20;
  cout << "The sum of both numbers is: " << a + b << endl;

  return 0;
}
```

Returns
The sum of both numbers is: 120

Float

- Float is like an integer, but is a decimal value.

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

int main() {

  float a = 10.3;
  float b = 19.9;
  cout << "The sum of both numbers is: " << a + b << endl;

  return 0;

}
```

Returns
The sum of both numbers is: 30.2

characters

- Char is used to return character values or a letter.

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

int main() {

  char a = 'c';
  char b = 'a';
  char c = 't';
  cout << "The character of c is: " << c << endl;
  return 0;

}
```

Returns
The character of c is: t

String

- Strings are sentences or full words.

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

int main() {

  string sentence = "I love to code!";
  cout << "Syem said: " << sentence << endl;
  return 0;

}
```

Returns
Syem said: I love to code!

Size of data types

Type	Bits	Range
int	16	-32768 to -32767
unsigned int	16	0 to 65535
signed int	16	-31768 to 32767
short int	16	-31768 to 32767
unsigned short int	16	0 to 65535
signed short int	16	-32768 to -32767
long int	32	-2147483648 to 2147483647
unsigned long int	32	-2147483648 to 2147483647
signed long int	32	0 to 4294967295
float	32	3.4E-38 to 3.4E+38
double	64	1.7E-308 to 1.7E+308
long double	80	3.4E-4932 to 3.4E+4932
char	8	-128 to 127
unsigned char	8	0 to 255
signed char	8	-128 to 127

Operators

Operator	Operation
+	add
-	subtract
/	divide
*	multiply
%	Return remainder

Example using operator

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

int main() {

 int a = 35;
 int b = 9;
 cout << "The sum is " << a + b << endl;
 cout << "The multiple is " << a * b << endl;
 cout << "A divided by b is " << a/b << "." << endl;
 cout << a%b << " is the remainder" << endl;
 return 0;

}
```

Returns
The sum is 44 The multiple is 315 A divided by b is 3. 8 is the remainder.

Compound Assignment Operators

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

int main() {

 int a = 35;
 a += 10; // compound addition
 a -= 5; // compound subtraction
 a /= 8; // compound division
 cout << "The final value is " << a << endl;
 return 0;

}
```

Returns
The final value is 5

Increment/Decrement Operators

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

int main() {

 int a = 35;
 int b = 10;
 a++; // post increment
 ++a; // pre increment
 --b; // pre decrement
 b--; // post decrement

 cout << "The final value of a is " << a << endl;
 cout << "The final value of b is " << b << endl;
 return 0;
}
```

Returns
The final value of a is 37 The final value of b is 8

Input

- Input your own value, or allow a user to input values using cin.

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

int main() {

 int age;
 string name;
 cin >> name; // allows user to input name
 cin >> age; // allows user to input age
 cout << name << " is " << x << " years old" << endl;
 return 0;


}
```

Returns
Input name: Syem Input age: 29 Syem is 29 years old

Takeaways from Today

- We learned about data types, variables, their size.
- Also learned about the various types of arithmetic operations.
- How to initialize data types, and perform arithmetic operations.
- Also learned to input our own values using cin>>.
- Think about how you can use C++ to develop something!!

Reference

- 1. Modern C++ for Absolute Beginners: A Friendly Introduction to C++ Programming Language and C++11 to C++20 Standards