NOI 2020 C++ Basics Course Content

Note 3

Variables

Since you are going to solve problems using c++ think of a scenario where you had to do a complex calculation and now you want to keep the answer saved so that you can use this value without redoing the calculation.
This is where variables are used. Variables are used to store some value temporarily so that it can be used in the code later.
Eg:

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

int main() {
	int myVariable = 20;
	int myVariable1 = 5+5;
	cout << myVariable;
	return 0;
}
```

This code will print 20 and 10 which are the stored value of myVariable and myVariable1(the answer of 5+5).

But it's not only numbers you want to temporarily save in a program. Therefore there are several types of variables that allow you to store different types of data. These are called data types.

Primitive data types

Type	Keyword	
Boolean	bool	true,false
Character	char	‘A’, ‘a’, ‘9’, ‘(‘, etc.
Integer	int	1,100,-12,0...
Floating point	float	1.25,0.34,-23.42,...
Double floating point	double	`2.22507e-308,` `1.79769e+308,...`
Valueless	void	

Extra resources:

- Data Types
  Reading: https://www.tutorialspoint.com/cplusplus/cpp_data_types.htm
  Video : https://www.youtube.com/watch?v=k2vrTlAlhRo

Variable declaration syntax

<variable type> <variable name> ;
<variable type> <variable name> = <value> ;

Eg:-

```
int myVariable;
double myVariable1 = 21.5;
```

Reusing variables

- Assigning values syntax
  <variable name> = <value>
  Eg:
  Int myVariable;
  myVariable = 10
- Reusing
  Eg: int newVar = myVariable + 5;

Declaring multiple variables

Multiple variables can be declared in the same line as long as they are the same type.

Eg :

```
int x, y=10, z=20;
```

Here the variable x is not initialized, y has the value 10 and z has the value 20 stored in them.

Extra resources:

- Variable declaration and initialization

  Video:
  - https://www.youtube.com/watch?v=vSTesJdgRCU
  - https://www.youtube.com/watch?v=uVi-wyuC-Fg

  Reading:
  - https://www.w3schools.com/cpp/cpp_variables.asp
  - https://www.w3schools.com/cpp/cpp_variables_multiple.asp

Constants

Constants are values that cannot be changed once assigned. Putting the ‘const’ keyword before the data type where you declare the variable makes that variable a constant.

Eg:

```
int x = 10; //THIS IS NOT A CONSTANT
const int x = 10; //THIS IS A CONSTANT.THE VALUE CANNOT BE CHANGED
```

Naming variables

There are rules that need to be followed when creating variable names.

- Must be unique (two variables cannot have the same name)
- Names can contain letters, digits and underscores
- Names must begin with a letter or an underscore (_)
- Names are case sensitive (`myVar` and `myvar` are different variables)
- Names cannot contain whitespaces or special characters like !, #, %, etc.
- Reserved words (like C++ keywords, such as `int`) cannot be used as names

Extra resources:

- Constants and variable naming conventions

  Video:
  - https://www.youtube.com/watch?v=3BhMsPNGBZ8
  - https://www.youtube.com/watch?v=Rl9w0hVxuRw

  Reading:
  - https://www.w3schools.com/cpp/cpp_variables_identifiers.asp
  - https://www.w3schools.com/cpp/cpp_variables_constants.asp