Variable

- Store data internally for program
- Store information from user

What kind of information/data are we storing?

What are we going to do about those data?
Variable Type

<table>
<thead>
<tr>
<th>Type</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>string</td>
<td>Store text</td>
</tr>
<tr>
<td>int</td>
<td>Integer – positive, negative whole numbers</td>
</tr>
<tr>
<td>double</td>
<td>Decimals, floating point numbers</td>
</tr>
<tr>
<td>bool</td>
<td>Boolean value – true/false, yes/no</td>
</tr>
<tr>
<td>char</td>
<td>Store a single character – a letter, single digit or a special character. ex: ?, Store as ASCII code</td>
</tr>
</tbody>
</table>

**C++ is case sensitive. Int ≠ int**
Declare Variable

- In order to use a variable, must create it first:

```c
variable_type variable_name;
```

- After declare the variable, whenever the variable name appears, it represents the data stores in this variable.
## Variable Name

<table>
<thead>
<tr>
<th>Rules</th>
<th>Variable Name Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>All letters are allowed, Upper case and Lower case</td>
<td>Abc</td>
</tr>
<tr>
<td></td>
<td>xYz</td>
</tr>
<tr>
<td>All integers are allowed, But can’t begin with an integer</td>
<td>Number1</td>
</tr>
<tr>
<td></td>
<td>checkPoint100</td>
</tr>
<tr>
<td>No special character is allowed, except underscore</td>
<td>first_name</td>
</tr>
<tr>
<td></td>
<td>My_Score</td>
</tr>
<tr>
<td>As a convention, variable always start with a lower case letter</td>
<td>pi_value</td>
</tr>
<tr>
<td></td>
<td>bookTitle</td>
</tr>
<tr>
<td>Can’t use C++ keywords</td>
<td></td>
</tr>
</tbody>
</table>
Declare Variable Examples

Valid:
string address;
string name;
string zipcode;
int age;
int x;
double pi;
bool check_point;
char second_Character;

Not valid:
INT x;
number y;
string first name;
int 5
bool yes?
int string;
string ‘welcome!’
Data for Type - string

A double quotation mark indicates the beginning of the string data. Indicate the end of data by another double quotation. All texts should be surrounded by a double quotation mark.

“This is a line of text.”
“10?”
“65-30 Kissena Blvd.”
“1234567”
“”
“string name”

Basically anything can be inside quotation mark. C++ is not trying to understand what is written inside quotation mark.
Data for Type - `int`

Any integers. No letters or special characters. Only negative sign is allowed.

10
0
2012
-99

Invalid Example:
```
```
```
```
```
```
```
zero
99.99
Data for Type - double

Any decimals, high precision
No letters, only negative sign and point is allowed.

Example:
2.0
3.14159
2.71
-3.5

Invalid:
‘4.5’
“3.14159”
neg 3
2 point 5
Data for Type - bool

Boolean, true or false

Example:
  true
  false
  0
  1

Invalid:
  ‘true’
  ‘false’
  ‘0’
Data for Type - char

Single character surrounded by single quote. ‘ ’
Example:

‘c’
‘2’
‘?’

For special character like tab or newline. C++ differentiate them by a back slash

‘\n’
‘\t’

All character is stored as an ASCII value internally. From 1-127

65 //ASCII value of letter ‘A’

Invalid:

‘character’
500
“\n”
How do we get the data?

- hard-coded the data by an equal sign to assign it
- get from the user through console

```cpp
string name;
name = "Kangmei";
cin >> name;
```

cin means get input from console. It follows by a double greater than sign and a variable name. The input will be stored as the data of the variable.
Output data

- To give the information to the user, output it on console.

    string host = "Kangmei";
    cout << "Welcome! ";
    cout << "I am " << host;
    cout << "Please enter your name: ";

    cout is followed by double less than sign. To output more than one data, you may joint them by another double less than sign.