

Class 03

Input Instructions, Assignment Operator, Arithmetic Operations

Variables

- Variables are used to store data in these boxes in memory
- Every variable needs a DATA TYPE and a NAME
- Variable names must conform to the following rules:
 - May only contain numbers, letters and underscores
 - Cannot begin with a number
 - Cannot be a C++ keyword
- Purely for reference, the list of C++ keywords is here:
<https://en.cppreference.com/w/cpp/keyword>

Primitive Data Types

- The computer needs to be told what type of data to store in memory
- Primitive types include:
 - Integer (int)
 - Double (double)
 - String (string)
 - Character (char)
 - Boolean (bool)

Declaring Variables

- Before we use a variable, we must declare it

- Model:

TYPE NAME;

- Examples:

int years;

double length;

string catName;

char letter;

bool isTrue;

Receiving User Input

- Steps:
 - Declare variable
 - Prompt user for input
 - Store user input in variable
- cin
 - Stands for “character input”
- Model:
`cin >> [variable name];`

Example 1 – Game Stats

- Plan:
 - Declare variable for score
 - Declare variable for knapsack weight
 - Initialize score to 0
 - Prompt the user for knapsack weight between 0 and 10
 - Store input from user into knapsack weight variable
 - Print the score and knapsack weight to monitor
 - Tell the user the game is beginning

Updating the value stored in a variable

- After a variable is declared, we can alter the value stored in it
- This is done via the assignment operator =
- Model:
 [variable name] = [value];

Arithmetic Operations

- Addition +
- Subtraction -
- Multiplication *
- Division /
- Remainder %

Arithmetic Expressions and Variables

- We can update the value stored in a number variable by performing arithmetic on it

```
score = score + 100;
```

- We can assign the result of an arithmetic expression to a number variable

```
knapsackWeight = 5 + 10 * 2 - 3;
```

Pitfall to watch for: Integer Division

- Normally, dividing an integer x by an integer y when x is not a multiple of y produces a number with a fractional component
 - Example: $7 / 2 = 3.5$
- In C++, if both operands are integers, the result will be an integer
 - Example: $7 / 2 = 3$