

Lecture 2: CS2400 Introduction to Computer Science

- Ethics
- Algorithms
- Programming
- C++

Ethics

What are some ethical issues related to Computer Science?

Why is it important to make sure we are good programmers?

What level of confidence do we have in our programs?

Psychology of Computer Science

Studying computer science can cause frustration!

- Planning

Do not code “off the top of your head”

- Time

“all-nighters”

- Extreme Precision

all it takes for a program not to work is one wrong character!

The Program Design Process

- Analyze the Problem
- Develop an Algorithm
- Document the Program
- Write Code for the Program
- Run the Program
- Test the Results

Two main phases:

- Problem-solving
- Implementation

Software Life Cycle

1. Analysis and specification of the problem
2. Design of the software
3. Implementation
4. Testing
5. Maintenance and evolution
6. Obsolescence

C++

Why is it called that?

An Example Program:

```
#include <iostream>
#include <cstdlib>
using namespace std;
int main()
{
    int number_of_pods, peas_per_pod, total_peas;

    cout << "Press return after entering a number.\n";
    cout << "Enter the number of pods:\n";
    cin >> number_of_pods;
    cout << "Enter the number of peas in a pod:\n";
    cin >> peas_per_pod;

    total_peas = number_of_pods * peas_per_pod;

    cout << "If you have ";
    cout << number_of_pods;
    cout << " pea pods\n";
    cout << "and ";
    cout << peas_per_pod;
    cout << " peas in each pod, then\n";
    cout << "you have ";
    cout << total_peas;
    cout << " peas in all the pods.\n";

    return EXIT_SUCCESS;
}
```


Explanation:

- beginning of the program
- end of the program
- variable declaration
- executable statements

Sample Run of the Program:

```
Press return after entering a number.  
Enter the number of pods:
```

```
10
```

```
Enter the number of peas in a pod:
```

```
9
```

```
If you have 10 pea pods  
and 9 peas in each pod, then  
you have 90 peas in all the pods.
```

Note:

To remember which way the arrows go in the `cin` and `cout` statements think about which way the data is flowing.

Program Layout

- Documentation standards
- Indentation
- Line Breaks

What happens the first time when you run your program?

Errors

- syntax errors
error message
warning message
- run-time errors
Examples?
- logic errors
Examples?

Variables

What is a variable in C++?

How do we call a variable?

Syntax:

Names of variables must start with a letter or “_”, and the remaining characters must all be letters, digits, or the “_” symbol.

Some names are “reserved” this means you cannot use them in your programs as variable names.

Examples:

`int`

`double`

`new`

...

For a complete list, see Appendix 1 of the book.

Variable Declarations:

- Must be declared before used
- Must have a type
- May declare many variables of the same type with one statement.

Syntax:

Type_Name Variable_Name_1, Variable_Name_2, ...;

Examples:

Where can you declare a variable?