Computer science programs are accredited by the Computing Accreditation Commission (CAC) of the Accreditation Board for Engineering and Technology (ABET). In order to accredit a program, CAC requires coverage of six major areas.

### Computer Science Content

- PROGRAMMING
- COMPUTER ARCHITECTURE
- DATA STRUCTURES
- ALGORITHMS
- SOFTWARE DEVELOPMENT
- THEORY AND FOUNDATIONS

### Begin with Programming and Algorithms

Features of your text. Throughout the text there are features that will aid you as you begin to develop software.

- Pitfalls
- Tips
- Self-Test Exercises
- Chapter Summaries
- Answers to Self-Test
Six Basic Sections of a Computer

- Input Unit
- Output Unit
- Memory Unit
- Arithmetic and Logic Unit (ALU)
- Central Processing Unit (CPU)
- Secondary Storage Unit

Languages

- MACHINE
- ASSEMBLY
- HIGH-LEVEL
Other High-level Languages

- FORTRAN
- COBOL
- BASIC
- PASCAL
- ADA

Typical C++ Environment

- Editor         Disk
- Preprocessor   Disk
- Compiler       Disk
- Linker         Disk
- Loader         Disk ---> Primary Memory
- CPU            Primary Memory

A Simple Program

// A simple program in C++
#include <iostream>
using namespace std;
int main()
{
    cout << "Welcome to C++!\n";
    return 0;  //indicate successful end
}
Escape Sequences

• \n  Newline
• \t  Horizontal tab
• \r  Carriage return
• \a  alert
• \\  backslash
• \"  Double quote

A “bit” and a “Byte” about Storage

Here we will take some time to look at how various quantities are stored in a computer.
• Integers (You should know how to convert base 10 to base 2.
• Characters - This too you should learn
• Floating: You will not be expected to do the conversions in this case.

Addition Program

// Addition Program
#include <iostream>
using namespace std;
int main()
{
  int integer1, integer2, sum;  //declare variables
  cout << "Enter first integer\n";  //prompt for input
  cin >> integer1;
  cout << "Enter second integer\n";  //prompt for 2nd
  cin >> integer2;
  sum = integer1 + integer2;  //add and assign
  cout << "Sum is " << sum << endl;  // print the sum
  return (0);  // successful end
}
Arithmetic

• Addition +
• Subtraction -
• Multiplication *
• Division /
• Modulus %
• Exponentiation

Note: Integer division yields an integer result.

Operator Precedence

• a * (b + c)
• a + b + c + d + e / 5
• (a + b + c + d + e ) / 5
• y = a * x * x + b * x + c
• y = (a * x * x) + (b * x) + c

Operator Precedence (Partial Story)

FIRST Parentheses ( )
SECOND Multiplication, division, Modulus *, /, %
LAST Addition, Subtraction +, -

Note: Any of these that are of equal precedence are evaluated left to right.