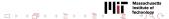
Introduction to Computer Programming

22.901 Introduction to Computer Programming for Nuclear Engineers

January 17, 2012



Outline

Programming Languages - Nuclear Perpsective

- Numerical Programming Languages
 - Fortran, C, C++, etc.
 - compiled languages
 - very fast, low-level programming
- Scripting Languages
 - Python, Perl, Visual Basic,etc.
 - interpreted languages
 - good for data/file manipulation
 - not as fast, high-level programming
- Developmental Languages
 - MATLAB, Python, etc.
 - great enviorment for algorithm development
 - excellent post-processing capability
 - recommend for HWs and projects



Coding Jargon

- Source Code an ASCII text file development by the programmer with code in it
- Compiler the program that converts the source code to machine code
 - C compilers gcc, icc ...
 - C++ compilers g++ ...
 - Fortran compilers f77, g77, f90, f95, gfortran, ifort ...
- Program the compiled source code



Fortran Programming Language

- In this course we will focus of Fortran
- Many nuclear engineering codes are still developed in Fortran!
- Classical Fortran
 - FORTRAN II-IV and Fortran 66 (1958-1966)
 - FORTRAN 77 standard programming language (still seen today!)
- Modern Fortran
 - Fortran 90,95,2003,2008
 - free format source code, structures, dynamic memory allocation





How can I use Fortran?

- Windows Download Cygwin and get the gfortran compilers
- Mac/Linux Download gfortran compilers
- In 22.901 we will SSH to the department's linux cluster
 - Windows download SecureFX/SecureCRT from MIT IST site
 - Mac/Linux SSH right from the terminal
- To Login the following info is needed for SecureCRT
 - hostname: cheezit.mit.edu
 - username: fortran12
 - passowrd: 22.901IAP2012
 - Mac/Linux: ssh fortran12@cheezit.mit.edu
- see Stellar document about navigating a Linux shell



The Simplest Fortran Code

EXAMPLE 1