CS122 Engineering Computation Lab
Lab 2

Bruce Char
Department of Computer Science
Drexel University
Winter 2010
Review of Lab 1 Cycle

• Lab 1 – pre lab quizlet, lab 1 and quiz 1 completed along with pre lab 2 quizlet
  – Quiz grades to be issued this week
  – More usage of CLC noticed than in cs121
• Initial chat session held on 1/18 – 5 attendees
• Initial extra consultation (by invitation) held on 1/21 – 3 attendees
• Major Lab 1 concepts to remember
  – Use of code edit regions to develop, test and debug scripts
  – Use of user defined functions to facilitate script development
  – Troubleshooting / debugging techniques (including Maple’s print functions)
Administrative Notes

• Please contact your individual instructors with questions and problems

• CLC (room 147 UC) will be staffed at same times as for cs121 in Fall (odd weeks)
  – Will increase number of consultants on Wednesday morning coverage

• Will continue on-line chat sessions – next meeting on Monday, 2/1 at 9:30 PM
Lab 2 Overview

- Based on materials from Chapter 10 and 11 readings
  - More script development, revisions from starter scripts
  - More practice with user defined functions
  - More usage of Maple’s plot features – line plots, multiple plots on same graph
  - Introduction on Maple’s table data structure – chapter 10
  - Repetition using “for” loops – chapter 11
Lab 2 Overview

• Lab 2 outline
  – Problem 1.1
    • A. revising a starter script to draw a red box
    • B. and C. develop a user defined function to draw the box
    • D. create an enhanced script that also lets the user define the position (lower left corner) of the box
    • E. develop a script within a code edit region that calls functions to draw a variety of boxes on the same graph
  – Part 2 – plotting time staged results of chemical reactions
    • 2.1 – complete a starter script to add additional component concentration results to tables and plot a single concentration over time
    • 2.2 – use tables and for loops to extend the script from 2.1 to plot results of all 4 chemical component concentrations over time
Lab 2 Maple Concepts: Discussion and Demo

• First, some notes on (script) programming style
  – Name user defined functions descriptively
    • Eg. Plot2lines versus P2
  – Use comments (#) within code edit regions to explain complex code or operations
  – Indent statements within “for” loops
    • for i from 1 to 10 do
      statement 1
      *
      statement n
    end do;
Lab 2 Maple Concepts: Discussion and Demo

- Maple’s “table” data structure – overview
  - Before using a table data structure, you must first declare a variable name as a table type - eg. Atab := table();
  - Each element of a table is accessed through an index (key)
  - An index is notated as tablename[index]
    - Eg. Atab[2]
    - Index is usually an integer, but can be any valid Maple value
    - We often combine tables with “for” loops to travel through all indexes of a table – see upcoming demo example
  - We often use tables (as opposed to lists) when we are constantly adding values to the data structure without knowing in advance the final number of values
  - When a Maple feature requires a list as input (eg. plot x and y points), we need to convert values stored in a table into an equivalent list:
    - Convert(tablename,list);
Lab 2 Maple Concepts: Discussion and Demo

• Maple’s “for” loop – overview
  – Used to repeat (loop over) a sequence of Maple statements a known number of times

    • Many variations to the basic format – we'll just focus on the basic structure in Lab 2 – see chapter 11 for complete discussion

  – Basic format / structure

    for i from 1 to numberofsteps do
        Maple statement(s);
    end do;

    where i is the “for” loop counter – keeps track of the step number
    and numberofsteps is the total number of times the loop (of Maple statements) will be executed

In our demo, we will note the powerful processing capabilities when combining loops with tables.
Lab 2 Maple Concepts: Discussion and Demo

• Demo of Maple features needed for this lab

  – Open the Maple worksheet demo file form the course web site
    • CS122Lab2Demo.mw
  – The following concepts are illustrated
    • Example 1
      – Maple’s line plotting feature
      – User defined functions
    • Example 2
      – Code edit region
      – Maple’s table data structure and “for” loop feature
      – User defined functions
Quiz Week (4) Activities

• Quiz 2 will be released on Friday (1/29) at 6 PM
  – Deadline: Wednesday (2/03) at 4:30 PM
  – Makeup quiz – from Thursday (2/04) at 9 AM through Sunday (2/07) at 11:30 PM
    • 30% penalty
• Pre-lab 3 quizlet
  – From Thursday (2/04 – 9 AM) through Monday (2/08 – 8 AM)
• Be sure to visit the CLC for quiz assistance
• Next chat scheduled for Monday, 2/1 at 9:30 PM in support of quiz 2