Problem Solving and Programming – Problem Solving

Lecture 2 – 5 steps

University of Minnesota – Five steps in programming solving

- Understand and isolate the problem
- Brainstorm for ideas to solve the problem
- Design a solution that might work
- Test your solution to see if it will work
- Assess whether the solution is good enough to do it

See http://cda.mns.umn.edu/~fauxr/computing/problemsolve.html

Understand and isolate the problem

- What does it take to succeed with a particular problem?
- What is the vital information?
- Identify the parts of the problems – analysis.
  - What are the inputs and outputs?

Brainstorm for ideas to solve the problem

- Note down all the solutions
  - Have solutions been used in similar way before?
  - Keep solutions that have common features.
  - Two heads are better than one.
  - When all the solutions have been found weed-out less reasonable ones.
  - Can be solo or group activity.

Design a solution that might work

- The design of a solution can be created using diagrams, algorithms and other models. The main purposes of creating a design that can be viewed by others is to communicate the solution. Providing a diagram or algorithm of what you THINK is going on and is needed will provide others a chance to see what your thinking is.
Test your solution to see if it will work

- Take the time to trace through your design with some test information.
- Try more than one scenario.
- Try to find information that tests the borders.
- Choose some information that isn't supposed to work and be certain that the design handles it.
- Give your algorithm or diagram to another person.

Assess whether the solution is good enough to do it

- Is this solution really worth doing?
- Would another solution be better for this situation?

Problem 2.1

Create a routine that converts Fahrenheit into centigrade.

Problem 2.2 Three tasks

- What are the problems with these tasks:
  - write a set of instructions to determine if a sandwich tastes good
  - write an algorithm to produce an accounting report
  - write an algorithm to judge a contest
- Produce a list of problems with these three tasks.

Problem 2.3

A rocket shape needs to be displayed on the screen.

```
 * *  
 *** * 
 *   * 
 *   * 
 **** *
```

- You only have a command print that will exactly display what is between a set of speech marks on the screen.
- You can assume that this command starts on a new line each time.
- E.g. print "hello World" will be appear as hello World