2-WhatIsAlgorithm.doc

CS 139 Activity – Exploring Algorithms

Content Objectives: At the conclusion of this activity students will be able to:

- Begin learning about algorithms and algorithmic language
- Create a first algorithm and test another groups' algorithms

Roles for this activity – Choose these from among your group, not duplicating the roles from day 1.

- MANAGER: Keep the group on task.
- RECORDER: Write the group consensus on the board.
- PRESENTER: Be prepared to explain your group's choices
- REFLECTORS: Watch the process of working through the exercise. Reflect on the Exit Pass any difficulties that your team has with the activity or with any content that may seem fuzzy.

PART 1 – Finish your worksheet from Day 1. In particular focus on writing the instructions and place them on the whiteboard for all teams to review. Answer question 6 and 7.

Stop here until all teams have put algorithms on the board and we have a class discussion.

PART 2 – More algorithm practice

Each group should develop an algorithm for building a paper airplane from a 8.5 by 11 piece of paper as described below.

The problem: You have a friend, Pat, who has never made a paper airplane before. You want to write down the steps so that Pat can practice independently.
In developing your algorithm, you should use the following steps:

1. Understand the problem. Make sure that your group can produce a paper airplane and each member understands how that is done. You will likely need to create a couple of planes to make sure you are all making the same one and to insure that you really understand the process. (You must understand your process before you can describe for others how to carry out the steps.)
2. Design the solution. Work through the instructions to produce your plane.
3. Test the solution. Take a fresh look at the algorithm and see if it can be improved.

You may need to repeat these steps several times.
Make sure that your algorithm has the following properties:

- It should be simple. No unnecessary steps or extra actions.
- Each step should perform only one action.
- Each step should be unambiguous. Your instruction should be interpreted in only one way.

An algorithm, if written well, should produce the same result each time given the same input.

BOARD – Recorder, record your group algorithm on the whiteboard in the front of the classroom.

PART 3 – Evaluate the work of others

After you have posted your algorithm, your group should pick one from others in the class and try to reproduce their plane following their directions.

If you successfully create an airplane, put your airplane into the tray below the algorithm.

If not, put an X next to the instruction that caused you difficulty or at the point that you could not continue.

Continue to try other airplanes, choosing ones first that have no responses yet.

Finally, as a group, consider the algorithms that worked and those that did not. What are the properties of the good algorithms?

Reporter: Be prepared to share one property with the class and be able to provide an example from a good algorithm.

MANAGER – Have someone from your team erase any work on the whiteboard. If you have rearranged chairs or tables, please return to their original positions. Turn in the Exit Pass and attendance sheet (if applicable).