Activity #3: Algorithmic Thinking
Recorder's Report

Manager: Reader:

Recorder: Driver:

Date: Score: Satisfactory   /   Not Satisfactory

Record your team's answers to the key questions (marked with) below.

(a) Model 1, Question #4

(b) Model 2, Question #5

(c) Model 3, Question #16

Activity #3: Algorithmic Thinking

In this course, you will work in teams of 3–4 students to learn new concepts. This activity will introduce you to the process of analyzing an algorithm complexity.

Content Learning Objectives

After completing this activity, students should be able to:

- Explain to other students how to duplicate a model
- Understand the need for clarity when describing an algorithm.
- Analyze the efficiency of oral and written algorithms.

Process Skill Goals

During the activity, students should make progress toward:

- Create oral algorithms
- Create a written algorithm

Model 1   Google Directions from KRH to Walmart

a) Head south towards SW 4th Street
b) Turn left onto SW 4th Street
c) Travel 499 feet
d) Turn right onto S. College Avenue
e) Travel 0.7 miles
f) Turn left onto Lamperti Lane
g) Travel 0.2 miles
h) Continue onto SE Lamperti Street
i) Travel 469 feet
j) Turn right into Walmart Parking Lot
k) Destination will be on the right

Refer to Model 1 above as your team develops consensus answers to the questions below.

1. Give at least one assumption that is being made in the directions above.

2. List at least two additional instructions that could be added to improve on these directions. Indicate where in the list they should be added.

3. An *algorithm* is a series of instructions that can be repeated over and over with the same results. Based on your answers above, give two important things to consider when describing an algorithm.

4. Think about the process of brushing your teeth. Write down step-by-step instruccions (e.g. an algorithm) that would allow somebody who has never brushed their teeth before to successfully accomplish this task.

Model 2   An Object Built Using LEGOs

Refer to Model 2 above as your team develops consensus answers to the questions below.

5. Give yourself a five minute timmer and then begin constructing your object. Remember that the **team manager** is the only one who can give instructions and the **team driver** and **presenter** may not see the original model. Work until your five minute timer runs out.

6. How many total instructions were given during your build time?

7. Looking through your list of instructions. Identify several that were useful and copy them below.

8. Looking through your list of instructions again, identify several that weren't helpful and list them.

9. Describe the types of instructions that work best in defining an algorithm.

10. How was this activity related to computer programming? How is it different?

Model 3   Your Own Object Built Using LEGOs

Important Instructions

Work together to construct a simple object using the LEGO building program. Once you are finished, take a screen shot of it to show later.

Refer to Model 3 above as your team develops consensus answers to the questions below.

11. Develop a written algorithm (list of instructions) for building your object.

12. Post your algorithm and a list of the number of each size of brick used in the general Teams channel.

13. Pick one of the other team's algorithm to construct their object. Reply to their instructions with a screen shot of your object.

14. How well did the other group do at building your object?

15. Suppose the object they built doesn't match your original. Describe a scenario in which it would be:

  a) the fault of the other team.

  b) the fault of your team.

16. Suppose a program you write does not do what you intended it to do. Describe a scenario in which it would be:

   a) the computer's fault.

   b) your fault as the programmer.

17. Which of the scenarios in the previous problem do you think is most likely?