

# DATA STRUCTURE AND ALGORITHMS

## LEARNING PLAN

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WEEK	2	DATE:	
TOPIC(S)	FLOWCHART AND ALGORITHMS	DURATION	3 HOURS

### OVERVIEW

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#### DATA

- facts and statistics collected together for reference or analysis.
- things known or assumed as facts, making the basis of reasoning or calculation.

#### STRUCTURE

- the arrangement of and relations between the parts or elements of something complex.

#### ALGORITHM

- a process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer:

### LEARNING CONTENT

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After conducting, pre-class activities such as checking attendance, atmosphere setting, announcements and issues discussion, the following activities should be done:

Instructions:

1. Form 4 groups in class (Number of groups may vary depending on the size of class)
2. Distribute the materials which will be needed in the activity
3. Discuss the objective of the activity and orient the students with the step by step procedures on how the activity will be performed and the time duration of the activity. The activity is expected to finish between 40 mins – 1 hr.
4. Let the students discuss with their groups each item on the activity sheet in order for them to fully understand the concept.

## WARM-UP ACTIVITIES/ REVIEW

The objective of this activity is to let the students realize the different types of models using three different activities.



## INSTRUCTIONS

After performing the activity, discuss with the class their answers and the procedures that they performed.

The students were asked to perform three activities which represent the three types of models:

1. Paper Origami – the creation of paper Origami represents physical models that are tangible, visible, and serve as miniatures of real-life objects.
2. Solving Problem – the equations solved by the students represent the mathematical models. Data manipulation represents the property of models to be manipulated and computed.
3. Flow Charting – the flowcharting activity represents the process model which shows that models are logical, process-specific, and follow step-by-step procedures.

GROUP members		SECTION	
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1. Autobots, Assemble!

You just bought a new car which happens to be a transformer. Do the following:

- a. Cut the shapes from the template given
- b. Assemble the cut parts to form the paper origami
- c. Additional Merits will be given to groups who finish first
  - i. 1st Group to finish - 20 pts
  - ii. 2nd Group to finish - 18 pts
  - iii. 3rd Group to finish - 15 pts
  - iv. 4th Group to finish - 12 pts

2. Do the Math!

With the rising cost of gasoline, the number of miles a car can be driven on a gallon of gas has become an important consideration. Determining the mpg for your car can help in your budgeting for gasoline costs. Further, decreases in the miles per gallon of gasoline could indicate that your car needs servicing. An effective way to get an accurate mpg reading is to do the following.

1. Record the odometer reading (OD1) when you fill up your car with gasoline.
2. At your next gasoline fill-up, record the odometer reading (OD2) and the number of gallons (g) of gasoline pumped.
3. The miles per gallon of gasoline can now be determined using the formula given Below:

$$\text{mpg} = \frac{\text{OD2} - \text{OD1}}{g}$$

Where: OD1 = 1st Odometer Reading

OD2 = 2nd Odometer Reading

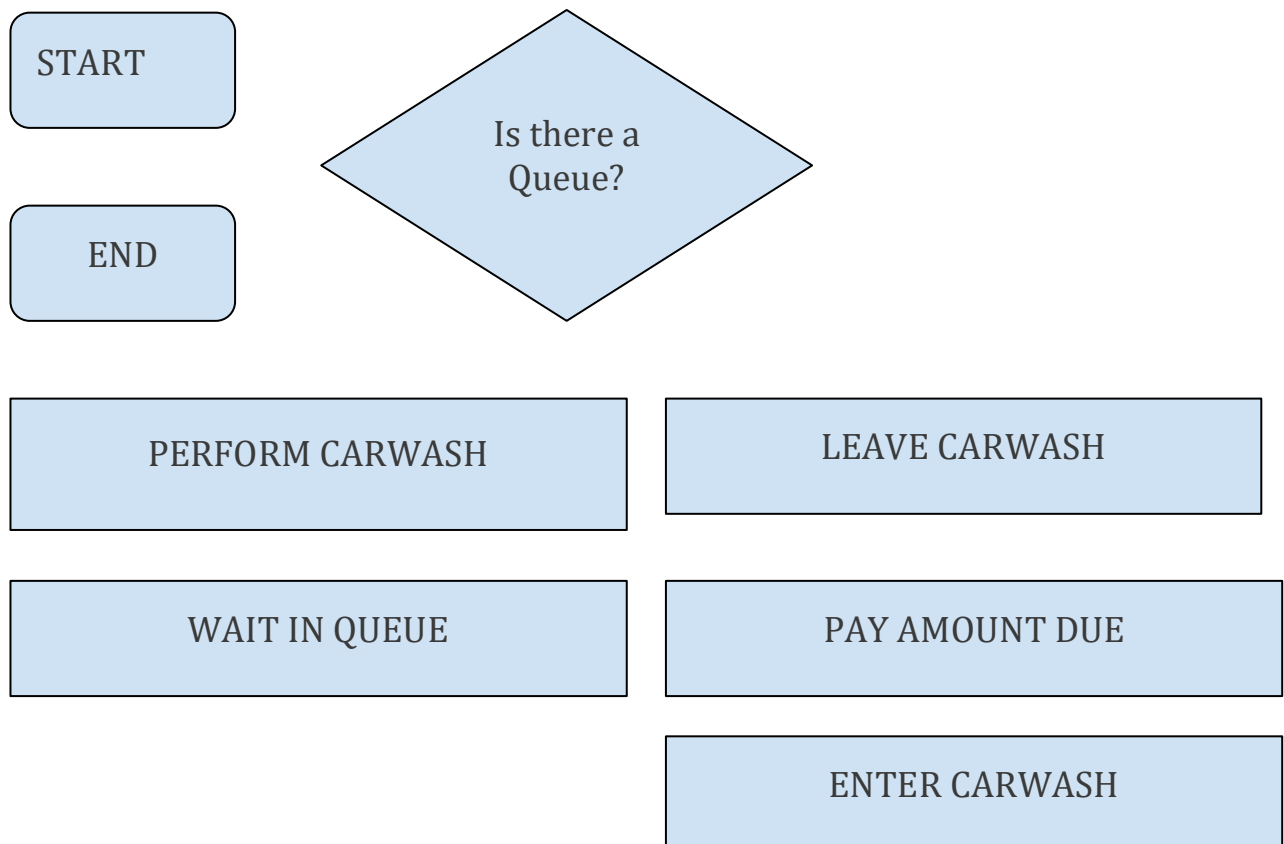
g = gallons

- a. The odometer reading when you filled up your Autobot was 27517.6. A week later you fill the Autobot up with 13.8 gallons of gasoline and the odometer reads 27759.5. What is the mpg-rating of your Autobot? (15 pts)

- b. If you drive an Autobot 1100 miles a month and the cost of gasoline averages \$3.25 a gallon, what are your gasoline costs for a year?

3. Step by step

After a few weeks of using the car, you notice that it needs a wash. Cut each shapes below and rearrange it as a flow chart on the next empty page. (20 pts)



## Questions:

I. Compare your first, second, and third outputs.

1. Which of the outputs can be considered the most tangible?

- A. The paper origami                      B. The computation                      C. The flowchart

2. Which outputs can be considered the most analytical and mathematical?

- A. The paper origami                      B. The computation                      C. The flowchart

3. Which outputs can be considered the most logical and process-specific?

- A. The paper origami                      B. The computation                      C. The flowchart

4. Which of the outputs represent a system? Encircle all that applies.

- A. The paper origami                      B. The computation                      C. The flowchart

5. Which of the outputs can be manipulated? Encircle all that applies.

- A. The paper origami                      B. The computation                      C. The flowchart

6. Based on their characteristics, what would it be if you were to name the three models?

The Paper Origami    - \_\_\_\_\_

The computation      - \_\_\_\_\_

The flowchart         - \_\_\_\_\_

If those three outputs are models, how are you going to define a MODEL?

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What specific knowledge/ skills should be equipped when building a model?

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