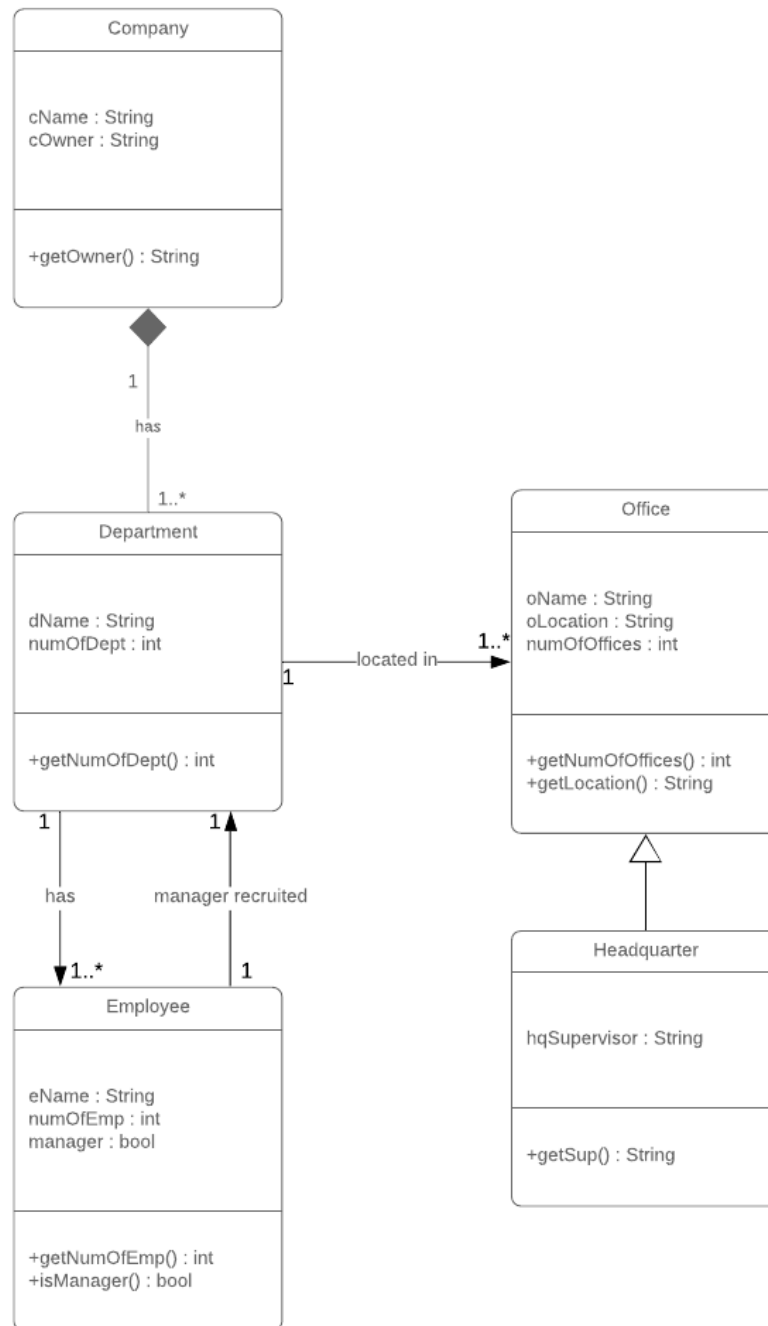Alec Guilin
CS 441
13 October 2019

CS 441 Assignment 3 (Individual Portion)

1)

2) Architectural Diagrams & Patterns:

a) A ticket vending machine used at a railway station.

The Blackboard Style:

I believe the blackboard style would be the best architecture pattern for this particular task. The blackboard style consists of having a central data structure and a collection of independent components that operate on the central data. For example, the several ticket vending machines would act as the collection of independent components that send and retrieve data to and from the central data structure for the railway station. Similarly, this pattern provides enhanced scalability allowing the railway station to easily add or remove vending machines to the system as needed.
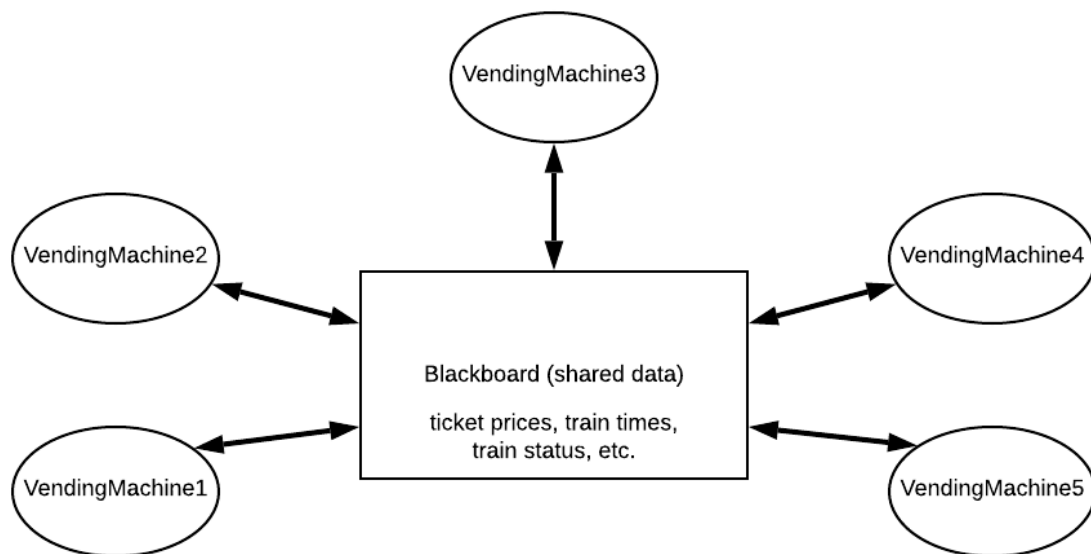

b) A 2D lunar landing video game.

Model-View-Controller (MVC):

I believe that the Model-View-Controller architecture pattern would be the best fit for this task. The controller handles all inputs from user and either requests information from the model and sends the received information to the view component, or the controller component directly sends the data to the view component if the model does not need to be updated. After the data gets sent to the view component, the information is then displayed to the user. In most video games, specifically 2D games such as Lunar Landing, the system will most likely be designed around heavy user input.

This system seems to handle user input and displaying the corresponding information very well.
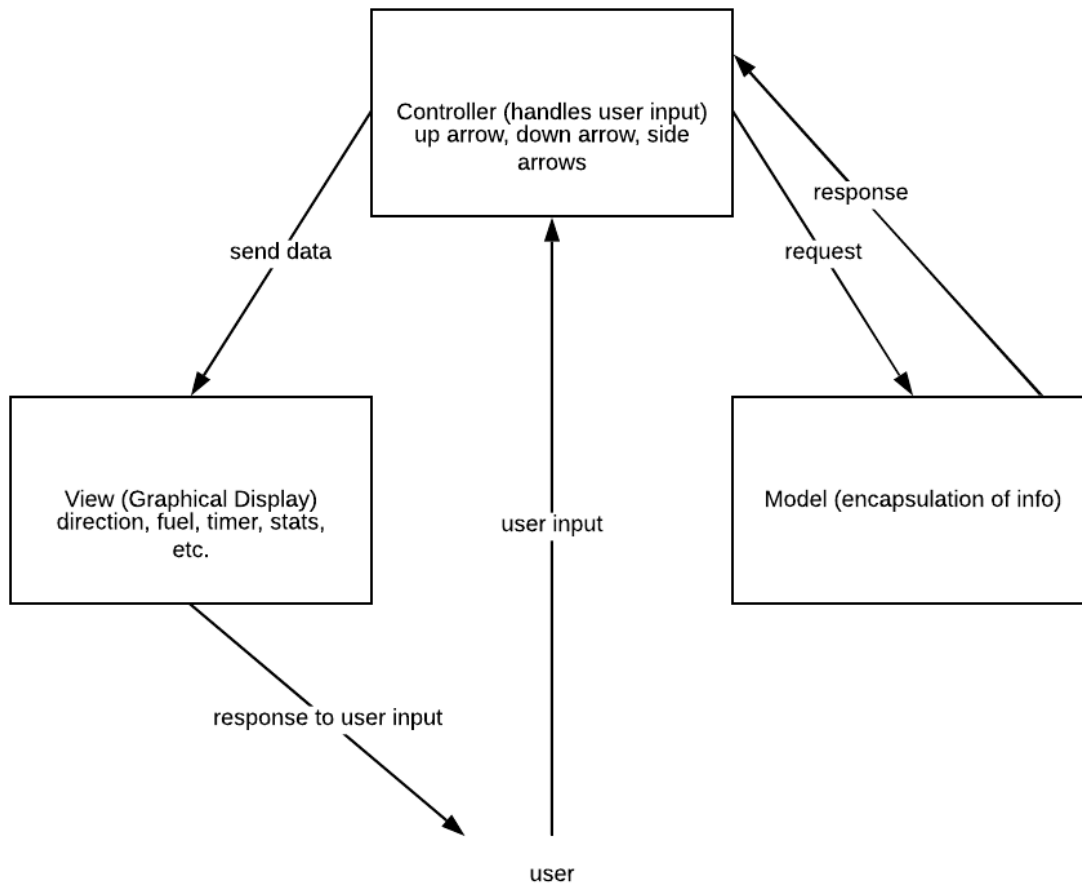
c) A robot floor-cleaner that automatically cleans the floor of a room. The cleaner must be able to detect walls and other obstructions.

Sense-Compute-Control:

I believe the Sense-Compute-Control model would be the best fit for this task. In order for a robot to actively move around a household environment and avoid all collisions, it would require sensors to capture and send data to the computer component that then sends controls to the corresponding actuators. The Sense-Compute-Control model allows exactly this and is well suited for this sort of task. Clock driven cycles, another reason this model would be the best fit, allow the sensors to be constantly scanning and condition checking.

Obstruction
Sensor1

Obstruction
Sensor2

Obstruction
Sensor3

Trash
Sensor4

Computer (Logic)

Actuator A

turnLeft()

Actuator B

turnRight()

Actuator C

stop()

Actuator D

clean()