CS586 PROJECT

CS 586; Spring 2019

Deadlines:
Part I: MDA-EFSM (5 points): **April 3, 2019**
After **April 7** the MDA-EFSM will not be accepted.

Part II: Final Project (30 points): **May 1, 2019**
Late submissions: 50% off
After **May 5** the final project will not be accepted.

This is an **individual** project not a team project.

Goal:
The goal of this project is to design two different Vending Machine (VM) components using the Model-Driven Architecture (MDA) and then implement these Vending Machine components based on this design using an object-oriented programming language.

Description of the Project:
There are two Vending Machine components: VM-1 and VM-2.

VM-1 component supports the following operations:

```
create(int p);          // starts a vending machine application, where p is an initial
                           price of a drink
coin(int v);            // a coin with value v is inserted
credit(float x)         // credit card is swiped, where x is an available fund
sugar();                // sugar button is pressed
tea();                  // tea button is pressed
chocolate();            // chocolate button is pressed
insert_cups(int n);     // n cups are inserted into the vending machine
set_price(int p);       // new price of a cup of tea/chocolate is set to value p
cancel();               // cancel selection for a cup of tea or hot chocolate
```

VM-2 component supports the following operations:

```
CREATE(float p);        // starts a vending machine application, where p is an initial
                           price of a drink
COIN(float v);          // a coin with value v is inserted
SUGAR();                // sugar button is pressed
CREAM();                // cream button is pressed
COFFEE();               // coffee button is pressed
InsertCups(int n);      // n cups are inserted into the vending machine
SetPrice(float p);      // new price of a cup of coffee is set to value p
CANCEL();               // cancel selection for a cup of coffee
```

Both Vending Machine components are state-based components that control simple vending machines. These vending machines dispose of a cup of tea/coffee/chocolate with or without additives (sugar and/or cream). The detailed behavior of both Vending Machine components is specified using EFSM. The EFSM of Figure 1 shows the detail behavior of VM-1, and the EFSM of Figure 2 shows the detailed behavior of VM-2. Notice that there are several differences between both Vending Machines.

Aspects that vary between two Vending Machine components:

a. Different methods of payment
b. Different drinks disposed
c. Different additives offered
d. Different messages displayed
e. Different operation names and signatures
f. Different data types
g. etc.

The goal of this project is to design two VM components using the Model-Driven Architecture (MDA) covered in the course. An executable meta-model, referred to as MDA-EFSM, of VM components should capture the "generic behavior" of two VM components and should be de-coupled from data and implementation details. Notice that in your design there should be **ONLY** one MDA-EFSM for two VM components. In addition, in the Model-Driven Architecture coupling between components should be minimized and cohesion of components should be maximized (components with high cohesion and low coupling between components). The meta-model (MDA-EFSM) used in the Model-Driven architecture should be expressed as an EFSM (Extended Finite State Machine) model. Notice that the EFSMs shown in Figure 1 and Figure 2 are **not acceptable** as a meta-model (MDA-EFSM) for this model driven architecture.

SUBMISSIONS & DEADLINES

Part I: MDA-EFSM
MDA-EFSM submission: Wednesday, April 3, 2019
After **April 7, 2019** the MDA-EFSM will not be accepted.

MDA-EFSM model report for the *VM* components should contain:

- A class diagram
- A list of meta events for the MDA-EFSM
- A list of meta actions for the MDA-EFSM, where the responsibility of each action must be described
- A state diagram/model of the MDA-EFSM
- Pseudo-code of all operations of Input Processors of *VM-1* and *VM-2*

The **hardcopy** of the assignment must be submitted. Electronic submissions are not acceptable. Notice that the Blackboard assignment submissions are only considered as a proof of submission on time (before the deadline). If the hardcopy is different than the electronic version submitted on the Blackboard, then **50% penalty** will be applied. If the assignment is submitted on the Blackboard on time, we must receive the hardcopy of the assignment by **3:00pm on Thursday, April 4**. If the hardcopy is received after this deadline, **20% penalty** will be applied.

Part II: Design and Implementation
Final Project submission: May 1, 2019
After **May 5** the final project will not be accepted.
The detailed description of the final project report and deliverables will be posted later on.