Producer & Consumer

assignment 5 programming

Video link :
https://youtu.be/gu4jymWB-yQ

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1-How to run our code :

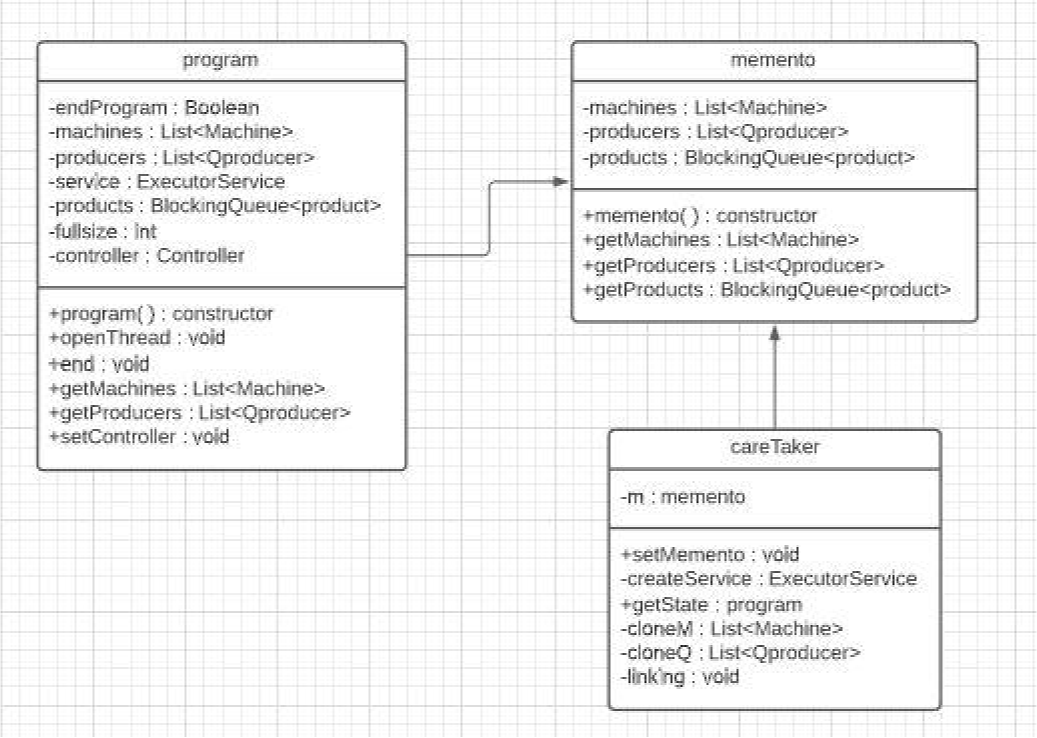
- Using Intellij IDE , open the project folder , then from file then project structure then libraries then the " + " button , choose the lib folder path of the javafx-sdk folder , then click apply then ok
- In Run , then Edit configuration ,choose application ,then Main, then in VM options put " --module-path "path of javafx-sdk folder/lib" --add-modules javafx.controls,javafx.fxml "
- You must have scene builder installed

2-How to use the program :

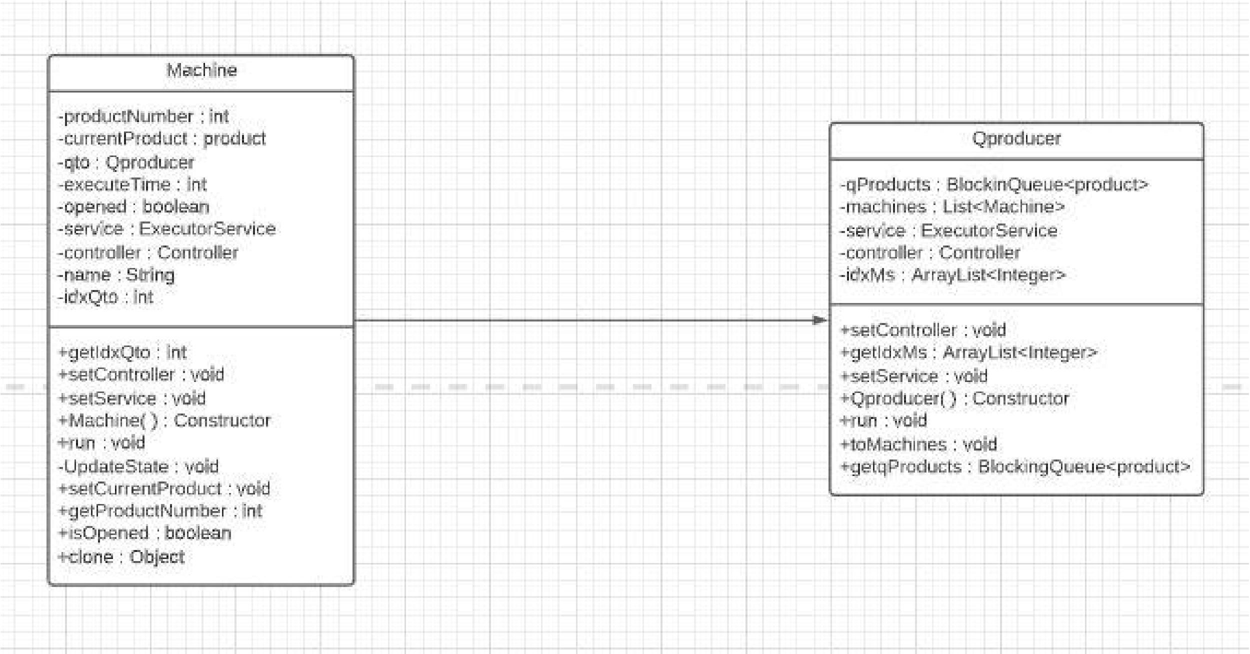
- To add components click "edit" button first then choose the click the component type machine or queue then click on the canvas to add this component
- To add another component click on its button then add it you don't need to click "edit" any more
- You can adjust the positions of the components by dragging them
- To connect machines and queues click "connect" button then click on the machine and queue you want and repeat for each pair
- The enter the number of products in the text field
- Then click "start" to run the process
- After the process is done you can replay it by clicking "replay"
- If you want to start another process you should click on "clear" then "edit" and start adding your components and connect them

3-UML :

Snapshot design pattern


program
-endProgram : Boolean
-machines : List<Machine>
-producers : List<Qproducer>
-service : ExecutorService
-products : BlockingQueue<product>
-fullsize : int
-controller : Controller
+program( ) : constructor
+openThread : void
+end : void
+getMachines : List<Machine>
+getProducers : List<Qproducer>
+setController : void
memento
-machines : List<Machine>
-producers : List<Qproducer>
-products : BlockingQueue<product>
+memento( ) : constructor
+getMachines : List<Machine>
+getProducers : List<Qproducer>
+getProducts : BlockingQueue<product>
careTaker
-m : memento
+setMemento : void
-createService : ExecutorService
+getState : program
-cloneM : List<Machine>
-cloneQ : List<Qproducer>
-linking : void

Observer design pattern



4-Applied Design Patterns :

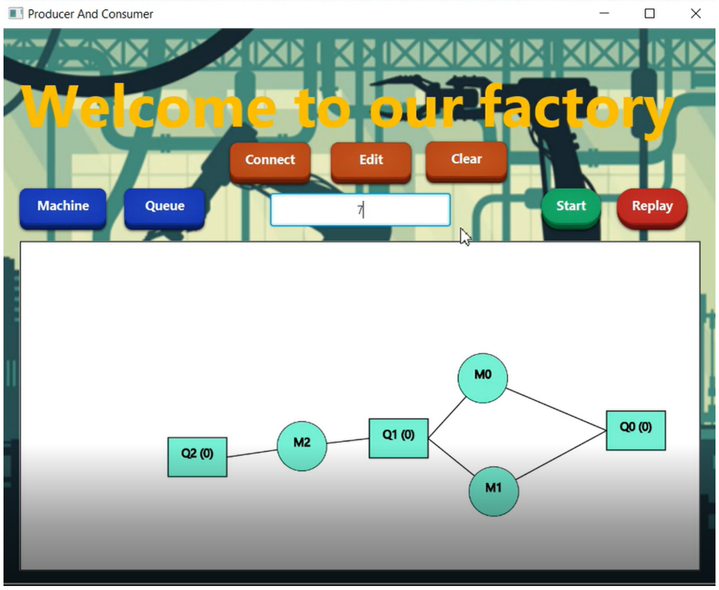
- Observer design pattern : We applied an observer pattern as the Machine(Observable) notified all the queues(observers) that it is available.

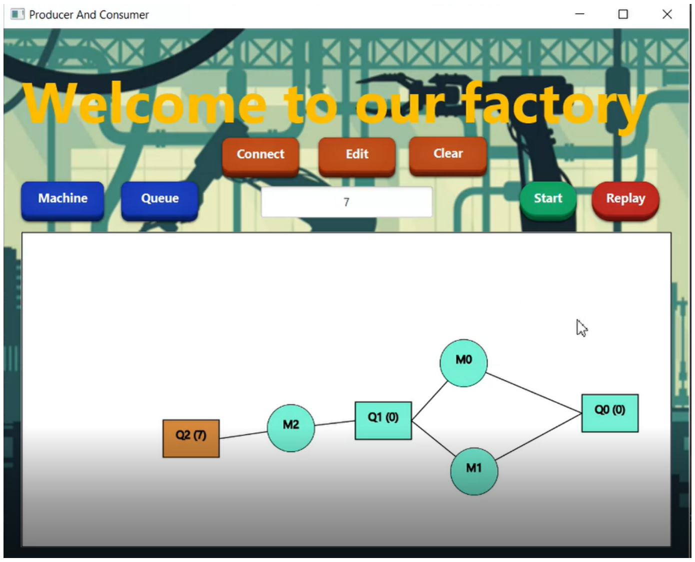
- Snapshot design pattern : We applied memento pattern as We save the state of every Machine class, Queue class, and Products then we set it when the user replayed the simulation.
- Concurrency : We used the Concurrency java package to open our machines in separate threads.

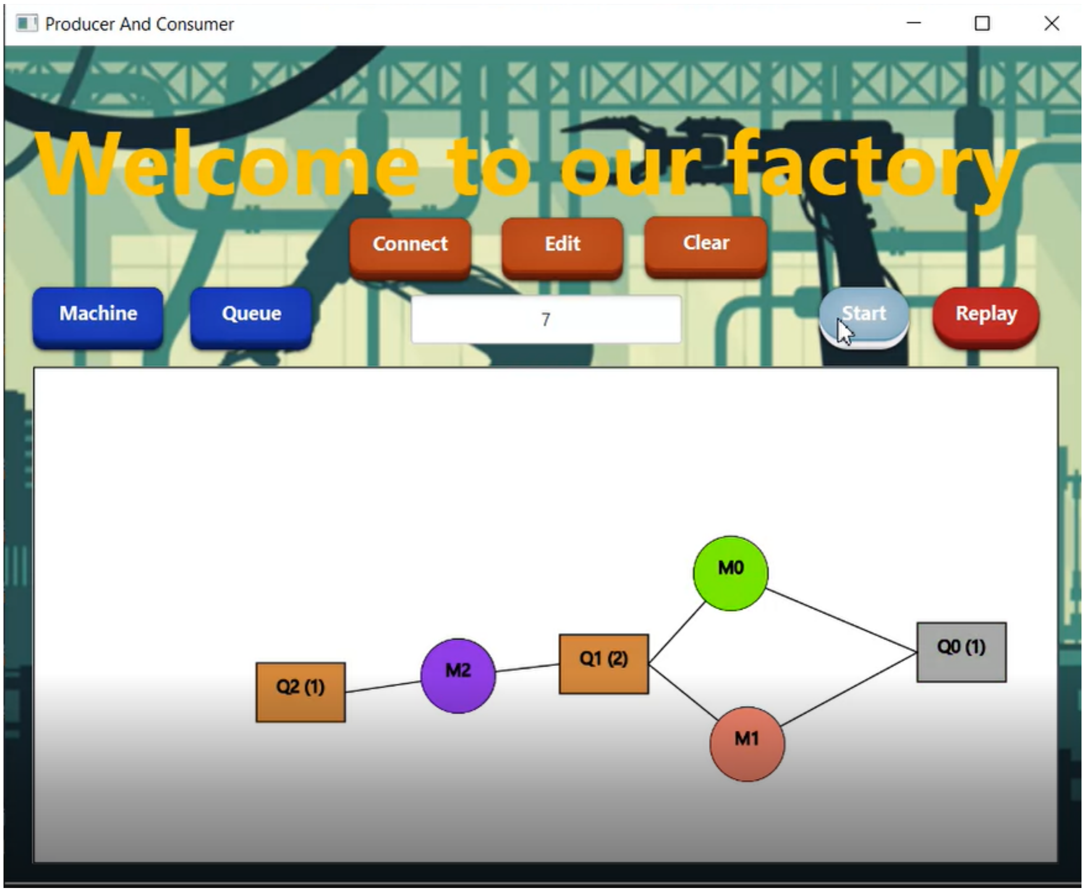
5-design decisions :

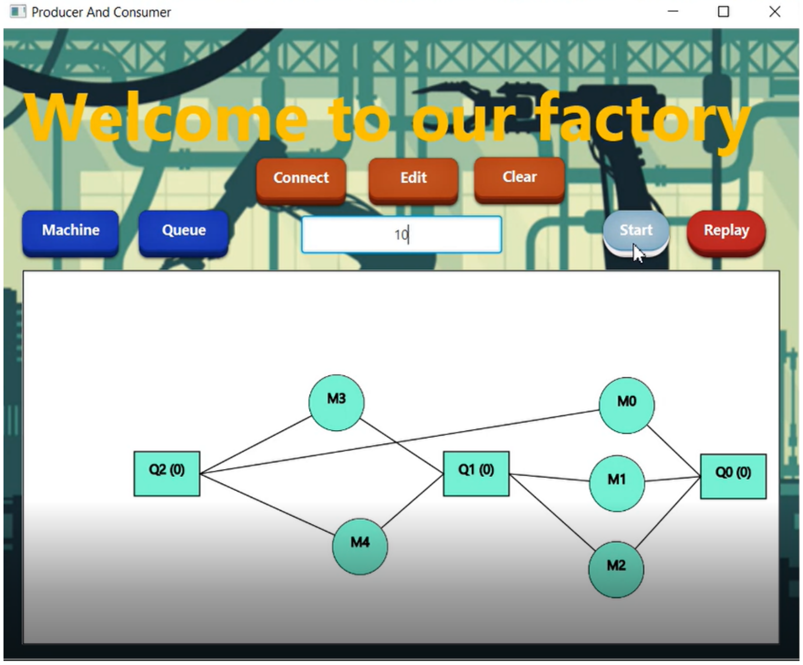
- Q0 has a random input rate as with each random time a random number of products arrives at Q0 until the product's list is empty.
- We treat a product as a class of its id and its color.
- User enters the number of products he wants so each product is assigned with a random color .
- At the end of this process the last Q should have all the products .

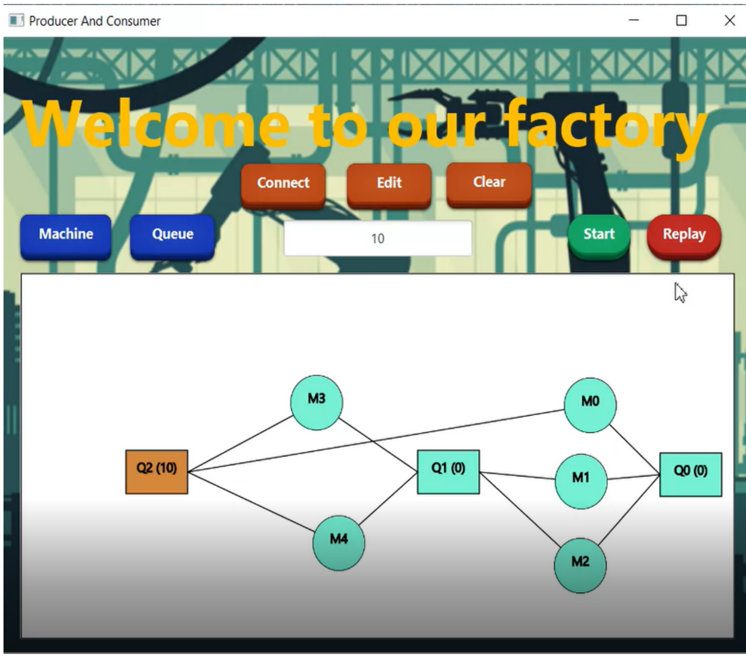
6-SnapShots :


Producer And Consumer
Welcome to our factory
Connect
Edit
Clear
Machine
Queue
7
Start
Replay
M0
Q2 (0)
M2
Q1 (0)
Q0 (0)
M1


Producer And Consumer
Welcome to our factory
Connect
Edit
Clear
Machine
Queue
7
Start
Replay
M0
Q2 (7)
M2
Q1 (0)
Q0 (0)
M1


Producer And Consumer
Welcome to our factory
Connect
Edit
Clear
Machine
Queue
7
Start
Replay
M0
Q2 (1)
M2
Q1 (2)
Q0 (1)
M1


Producer And Consumer
Welcome to our factory
Connect
Edit
Clear
Machine
Queue
10
Start
Replay
M3
M0
Q2 (0)
Q1 (0)
M1
Q0 (0)
M4
M2


Producer And Consumer
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Edit
Clear
Machine
Queue
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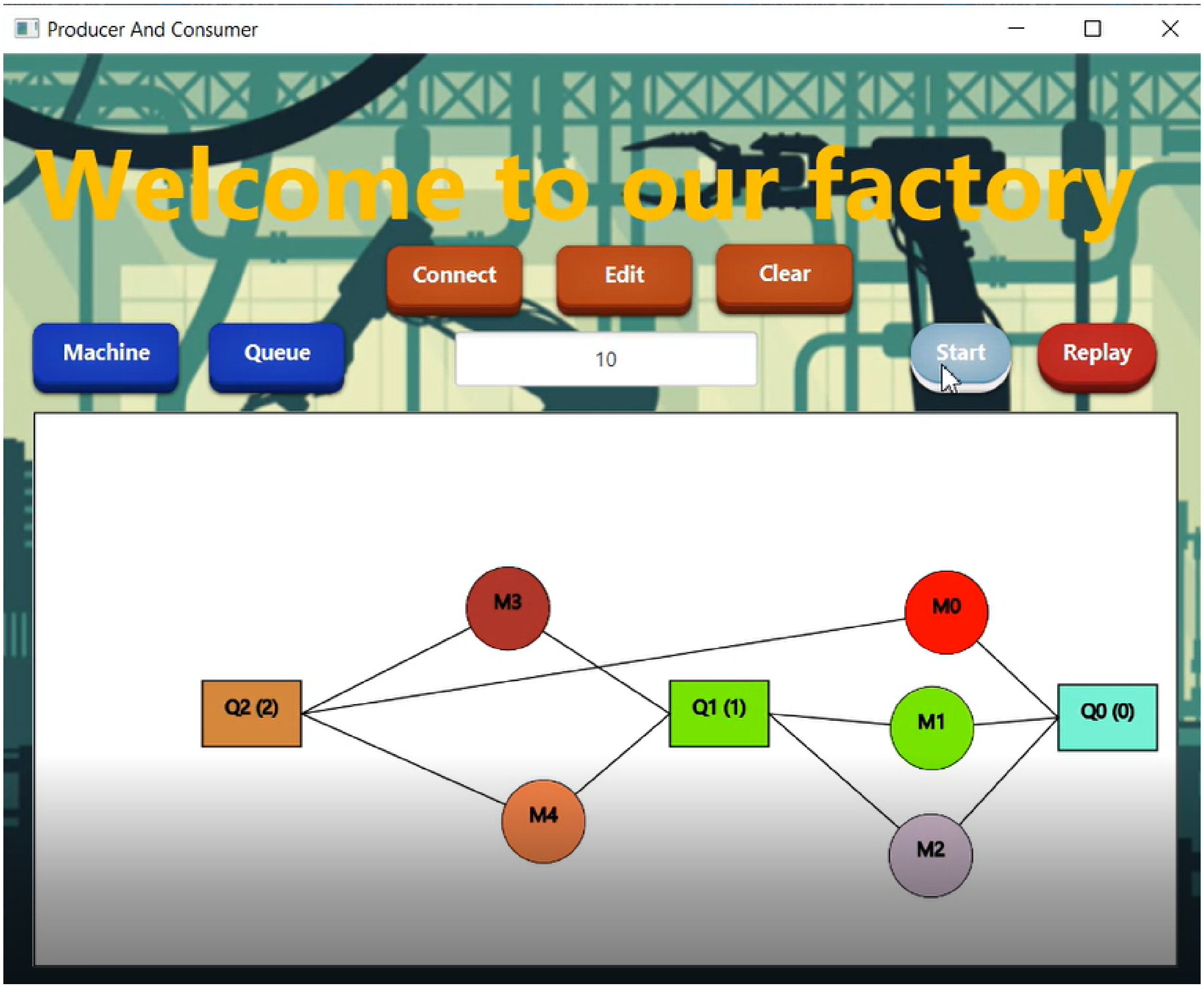
Start
Replay
M3
M0
Q2 (10)
Q1 (0)
M1
Q0 (0)
M4
M2


Producer And Consumer
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Queue
10
Start
Replay
M3
M0
Q2 (2)
Q1 (1)
M1
Q0 (0)
M4
M2