Software Development 3

Creating and using Activity diagrams in Visual Studio 2010

1) View the movie “ActivityDiag.wmv”, it demonstrates the principles involved in creating an activity diagram using Visual Studio 2010.
2) A use case for student matriculation has the following description

> *When matriculating the student will supply their personal details (name, address, date of birth). Once these details have been stored a matriculation number will be generated. The student will then provide details of their desired programme of study. The student will then be enrolled on the appropriate programme.*

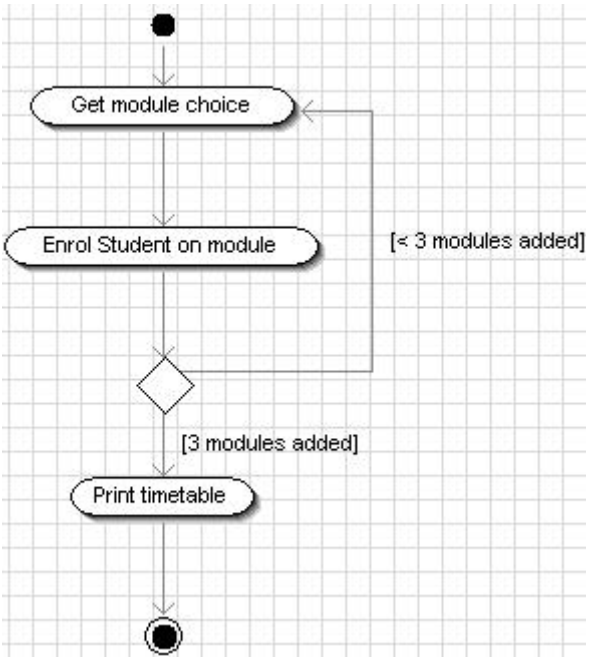
In Visual Studio create an activity diagram based on the above use case.

3) An important concept within activity diagrams is the decision which allows alternative sets of actions to be modelled along with the conditions associated with them. The use case described in section 2 has the additional requirement added to it so that it now reads:

> *When matriculating the student will supply their personal details (name, address, date of birth).* ***If the student is an overseas student then their passport number must be entered.*** *Once these details have been stored a matriculation number will be generated. The student will then provide details of their desired programme of study.* ***Students who are funded by SAAS must have their SAAS number recorded, non SAAS students must have their means of payment recorded.*** *The student will then be enrolled on the appropriate programme.*

Create an amended activity diagram to reflect the new use case.

4) Activity diagrams may also incorporate *iterations* or loops, when an activity occurs many times. Consider this example:



In the above case we repeat “Get module choice” and “Enrol Student on module” until 3 modules have been added.

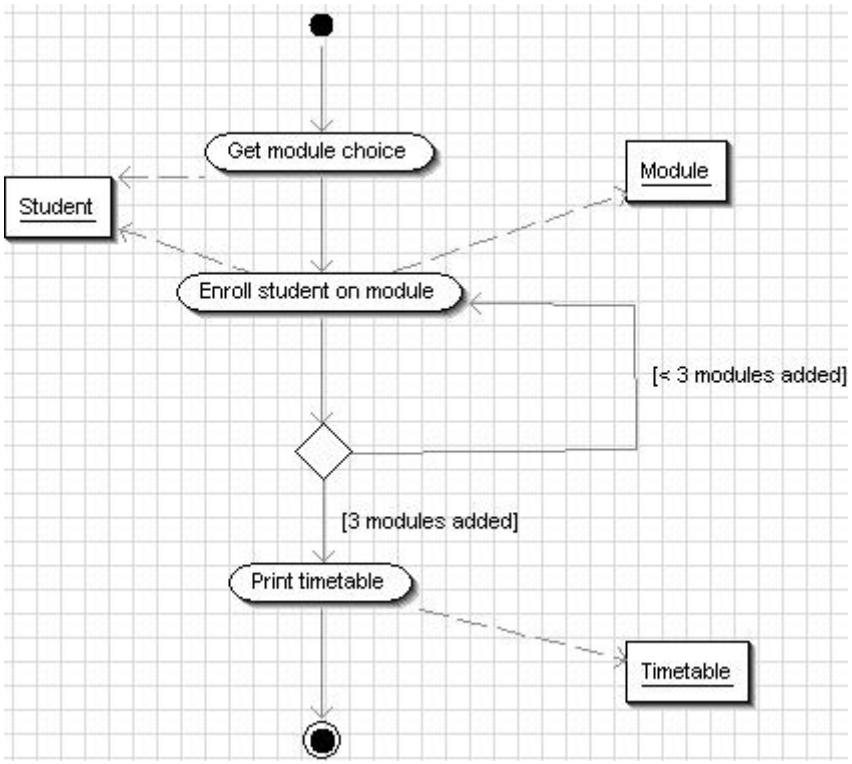
Consider the following use case for an airport boarding system.

Passengers for a flight will be called to the departure lounge. When the flight commences boarding the list of checked-in passengers will be retrieved. Each passenger will then their boarding card scanned as they board and their ID number checked against the checked in list . If the passenger has not checked in for the flight an alert message should be generated otherwise they will be allowed to board. If all the passengers on the checked-in list have boarded then the passenger manifest list will be printed.

Produce an activity diagram using Visual Studio for the airport boarding system.

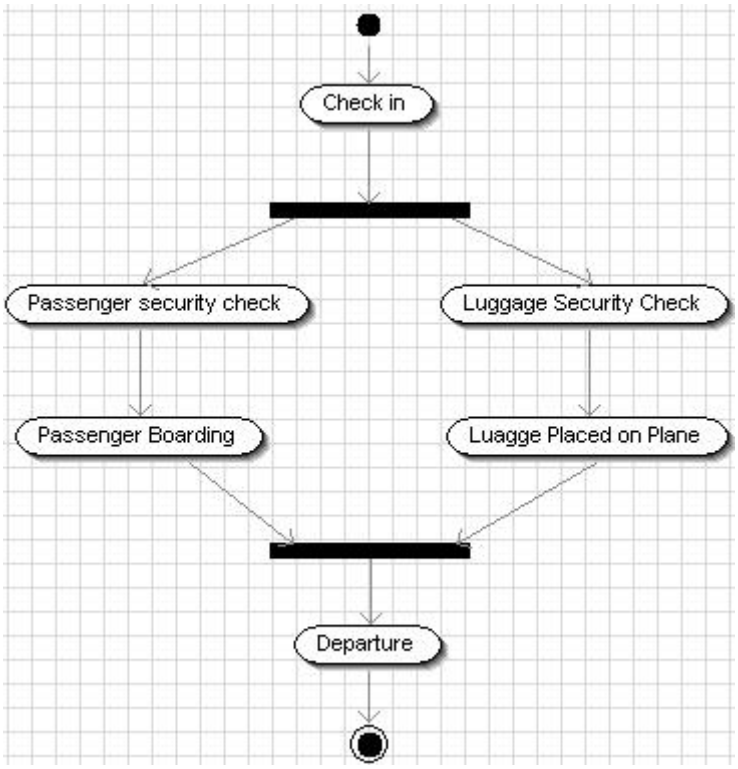
5) We may introduce the concept of objects into our Activity diagrams, where we can identify that an activity is associated with an object we can record this.

Consider the student example in step 4; it would appear that the activity interacts with three objects Student, Module and Timetable as follows:



Examine your activity diagram created in response to step 4. Identify any objects that the activity interacts with and add them to your diagram.

6) Within the systems that we are modelling some of the activities may happen at the same time. Consider the following example of an airport:

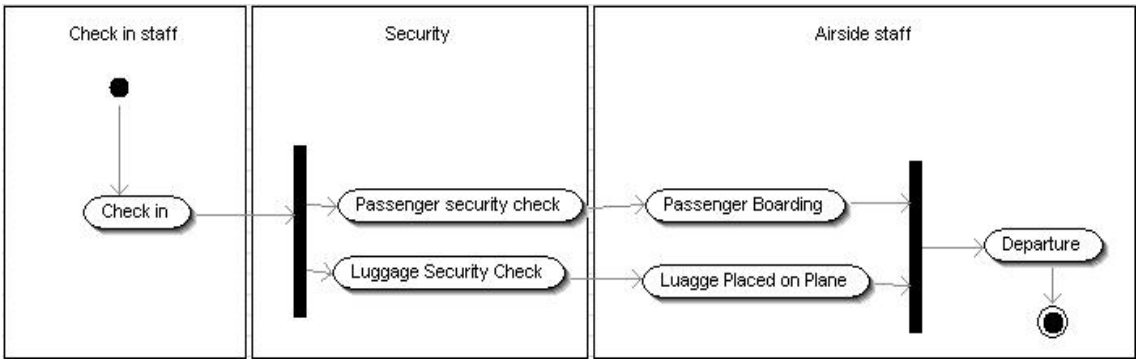


This the activities “Passenger Security Check” and “Passenger Boarding” happen at the same time (*concurrently*) as “Luggage Security Check” and “Luggage Placed on Plane”. There is no decision involved all 4 activities always take place. The action of splitting an activity diagram in this manner is known as *forking*.

7) Create an activity diagram for the following scenario:

Fireplaces-R-us sell fireplaces. A customer places on order with them for a mantelpiece and a fire. The customer’s payment is processed, If the payment is declined then the customer is emailed and the order cancelled.
An order is placed for the mantelpiece with the appropriate manufacturer, and order is also placed for the fire with a separate fire manufacturer. When these each of these items arrive they are stored until they have both arrived.
Once both fire and mantelpiece have arrived they customer is emailed a date for installation. If the customer responds confirming the date installation goes ahead, otherwise another date is suggested.
Once a date has been agreed the install is scheduled and takes place on the agreed date.

8) The activity diagrams we have discussed so far have many activities, each of these activities should be the responsibility of a particular person or entity. Consider our Airport example once more:



We have used partitions (sometimes called *swim lanes)* to allocate each of our activities to one of three entities. This allows us to divide up our activities between objects. To add partitions to your diagram use the “Create a partition” option on the right-hand side of the diagram menu bar. You should draw the partition first and then add activities within it.

9) Refer back to step 3. At this step you produced an activity diagram covering matriculation. Redraw the diagram using partition to allocate activities to people or objects.

Possible partitions could include :

Student
Programme Leader
Finance Dep.
Records System