# SOFTWARE ENGINEERING LABORATORY

Question-1	To exhibit skills on modeling concepts learnt – Use Case Diagram

Identify the use cases and actors for Passport Automation System and depict it with a Use Case diagram:

Passport Automation System: To simplify the process of applying passport, software has to be created. Initially the applicant will login to passport automation system and submits his details. These details are stored in the database and verification process is done by the passport administrator, regional administrator and police, the passport is issued to the applicant.

1. Passport Automation System is used in the effective dispatch of passport to all of the applicants. This system adopts a comprehensive approach to minimize the manual work and schedule resources, time in a cogent manner.

2. The core of the system is to get the online registration form (with details such as name, address etc.,) filled by the applicant whose testament is verified for its genuineness by the Passport Automation System with respect to the already existing information in the database.

3. This forms the first and foremost step in the processing of passport application. After the first round of verification done by the system, the information is in turn forwarded to the regional administrator's (Ministry of External Affairs) office.

4. The application is then processed manually based on the report given by the system, and any forfeiting identified can make the applicant liable to penalty as per the law.

5. The system forwards the necessary details to the police for its separate verification whose report is then presented to the administrator. After all the necessary criteria have been met, the original information is added to the database and the passport is sent to the applicant.
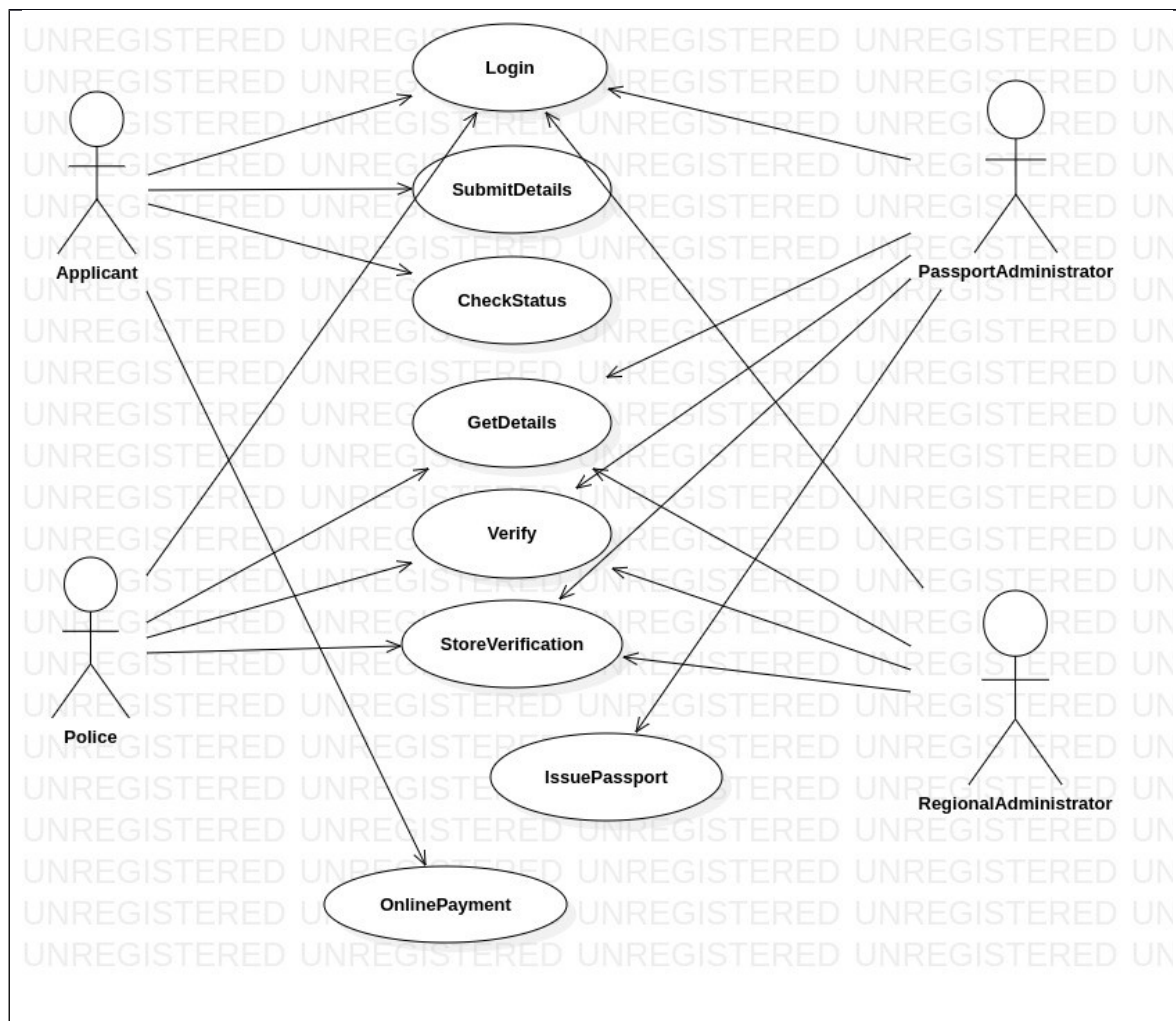
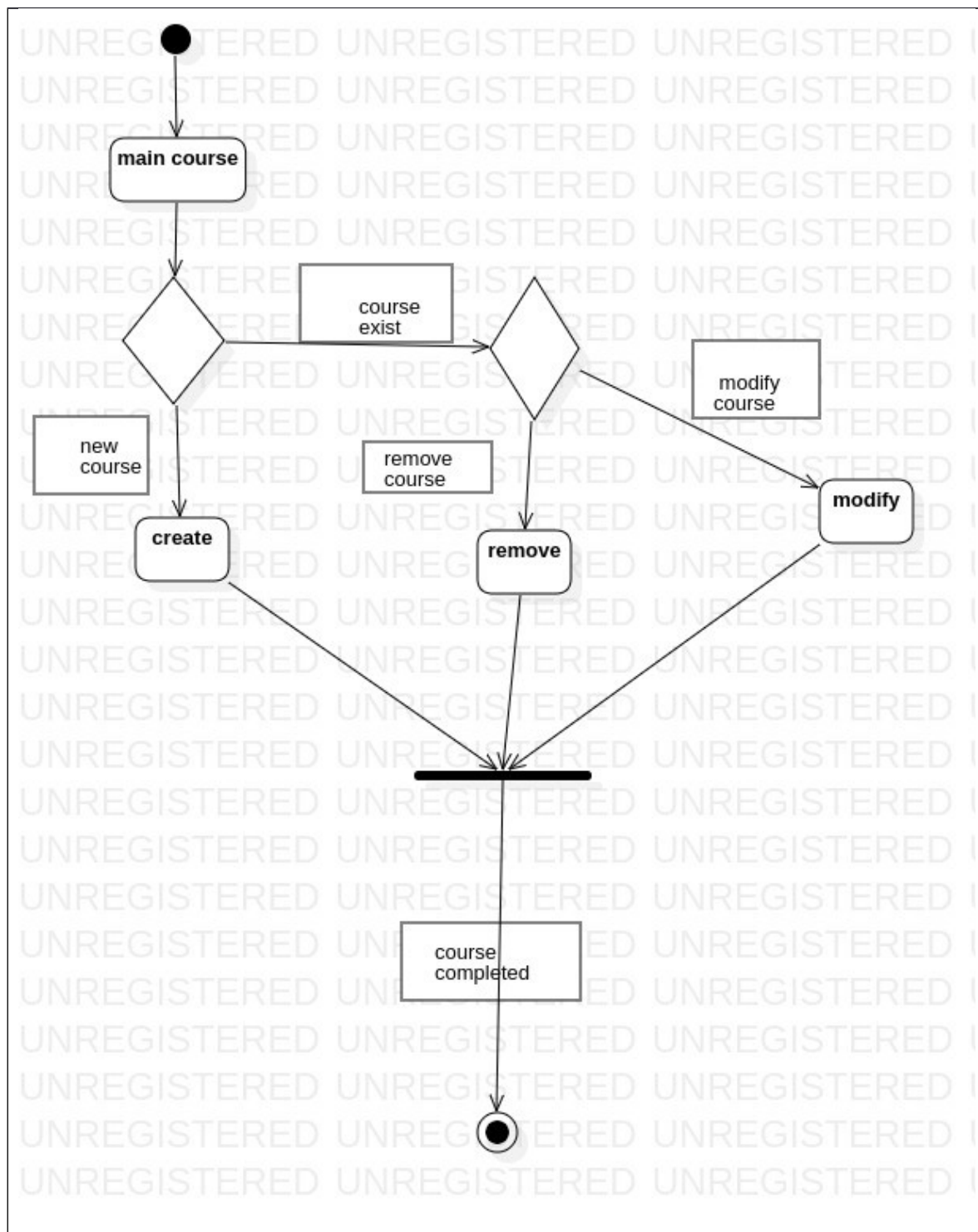| Question-2 | To exhibit skills on modeling concepts learnt – Activity Diagram |

Identify the activities and transitions for managing course information and depict it with an activity diagram:

Managing course information: The course administrator is responsible for managing course information in the Course Management System. As part of managing the course information, the course administrator carries out the following activities: • Check if course exists

• If course is new, proceed to the "Create Course" step

• If course exists, check what operation is desired—whether to modify the course or remove the course

• If the modify course operation is selected by the course administrator, the "Modify Course" activity is performed

• If the remove course operation is selected by the course administrator, the "Remove Course" activity is performed. In the first step in this Activity diagram, the system determines whether the course that is to be managed is a new course or an existing course.

For managing a new course, a separate activity, "Create Course," is performed. On the other hand, if a course exists, the course administrator can perform two different activities—modify an existing course or remove an existing course. Hence, the system checks the type of operation desired based on which two separate activities can be performed—"Modify Course" or "Remove Course".
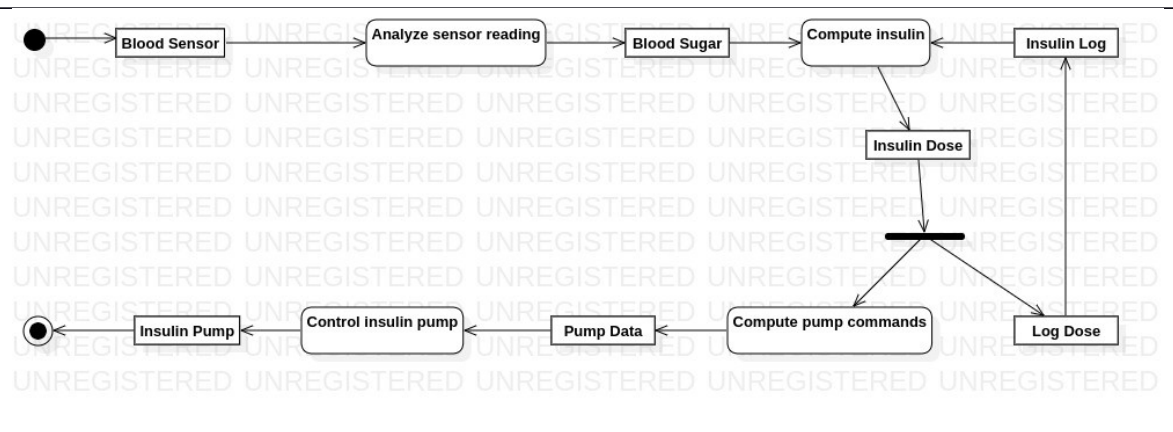
Question-3	To exhibit skills on modeling concepts learnt – Activity Diagram

Identify the activities and transitions for managing insulin pump and depict it with an activity diagram with object flow.

Automated Insulin Pump: An insulin pump control system is a medical system that simulates the operation of the pancreas (an internal organ). The software controlling this system is an embedded system, which collects information from a sensor and controls a pump that delivers a controlled dose of insulin to a user. People who suffer from diabetes use the system. Diabetes is a relatively common condition where the human pancreas is unable to produce sufficient quantities of a hormone called insulin. Insulin metabolises glucose (sugar) in the blood. The conventional treatment

of diabetes involves regular injections of genetically engineered insulin. Diabetics measure their blood sugar levels using an external meter and then calculate the dose of insulin that they should inject. The problem with this treatment is that the level of insulin required does not just depend on the blood glucose level but also on the time of the last insulin injection. This can lead to very low levels of blood glucose (if there is too much insulin) or very high levels of blood sugar (if there is too little insulin). Low blood glucose is, in the short term, a more serious condition as it can result in temporary brain malfunctioning and, ultimately, unconsciousness and death. In the long term, however, continual high levels of blood glucose can lead to eye damage, kidney damage, and heart problems. Current advances in developing miniaturized sensors have meant that it is now possible to develop automated insulin delivery systems. These systems monitor blood sugar levels and deliver an appropriate dose of insulin when required. Insulin delivery systems like this already exist for the treatment of hospital patients. In future, it may be possible for many diabetics to have such systems permanently attached to their bodies. A software-controlled insulin delivery system might work by using a micro-sensor embedded in the patient to measure some blood parameter that is proportional to the sugar level. This is then sent to the pump controller. This controller computes the sugar level and the amount of insulin that is needed. It then sends signals to a miniaturized pump to deliver the insulin via a permanently attached needle. Draw an UML activity model that illustrates how the software transforms an input blood sugar level to a sequence of commands that drive the insulin pump with object flow.

Question-4	To exhibit skills on modeling concepts learnt – Sequence Diagram

Identify the activities and transitions for managing passport automation system and depict it with a Sequence diagram (Objects to be considered for sequence diagram: application, passport administrator, regional administrator, police, database). Show all the interaction which occur from the request login to issue of passport.

sd SequenceDiagram1

| Applicant | PP Admin | Regional Admin | Police | Database |

1 : Log In

2 : Submit Details

3 : Store Details

4 : Verify Details

5 : Update Verified Details

6 : Send Details

7 : Verify Details

8 : Send Verification

9 : Update Details

10 : Send Details

11 : Verify Details

12 : Send Verification

13 : Update Details

14 : Issue Passport