**Software Engineering Project**

**Section: B01**

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Group Members:

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**Question 1)**

1. **Data Flow Diagram**
2. **Use Case Diagram**
3. **Explain which of these two you prefer best to analyze a system and why**

Ans) We would prefer Data Flow diagram to analyze our system as use case diagram provides only functions along with scope of the system. While the Data Flow Diagram shows logical movement of data throughout the system, i.e., it shows how data moves between processes which makes it easier to analyze and comprehend the system in a better way.

**Question 2) Developing use case specifications**

1)

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| **Use case Id:** | Manage Tourist Visa | |
| **Brief Description** | Tourist applies for Visa. System checks for tourist’s previous application. Police System check for any criminal records. If everything is clear, duration of visa is decided, payment is made by the tourist and the Immigration Officer approves it. | |
| **Primary actors** | Tourist, Police System, Bank, Immigration Officer | |
| **Trigger(s)** | Tourist requests for online application form | |
| **Preconditions:** Applicant should be tourist  Tourist must have a valid passport | | |
| **Post-conditions:** Tourist visa is issued | | |
| **Normal Scenario** | | |
| Actor Action | | System Response |
| 1. Tourist requests for online application form | | 2. Display form |
| **3.** Tourist fills form and attaches copy of image and passport | | 4. Save all information and retrieve status of previous visa application (see 4a) |
|  | | 5. Retrieve status of application |
|  | | 6. Contact police system for criminal record |
| **7.** Police System sends feedback | | 8. Verify rules of visa duration of nationality and determine duration of visa (see 8a) |
|  | | 9. Ask credit card details of the tourist |
| **10.** Tourist sends credit card details | | 11. Forward credit card details to bank |
| **12.** Bank sends payment status | | 13. Prepares visa with duration and assign unique visa number (see 13a) |
|  | | 14. Send visa for approval to Immigration Officer |
| **15.** Immigration officer sends approval | | 16. Notify AccSys about payment with visa number (see 16a) |
|  | | 17. Inform Tourist about visa status |
| **Alternative flows:**  4.a. If any information is missing, ask for missing information  8.a. If police feedback is not ok, reject the application  13.a. If payment is not ok, reject the application  16.a. If immigration officer does not approve, reject the application | | |

2)

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| **Use case Id:** | Manage Work Visa | |
| **Brief Description** | Employer of person applies for visa, system checks for job confirmation and police report. If Employer’s total number of visa does not exceed the limit, bill is created and work visa is created after approval from the Immigration officer | |
| **Primary actors** | Employer, AccSys, Immigration Officer | |
| **Trigger(s)** | Employer initiates request for online application form | |
| **Preconditions:** Applicant should be employer | | |
| **Post-conditions:** Employee visa is issued  Employer total visa is incremented | | |
| **Normal Scenario** | | |
| Actor Action | | System Response |
| 1. Employer requests for online application form | | 2. Display online application form |
| **3.** Employer provides details of the person | | 4. Save all information and contacts Employer System for job confirmation and police report. (See 4a) |
| 5. Employer System sends the job confirmation and police report | | 6. Verify job confirmation and police report (See 6a) |
|  | | 7. Check whether total number of work visa of Employer exceeded or not (See 7a) |
|  | | 8. Prepare Bill for the employer |
|  | | 9. Ask AccSys for financial report about employer |
| 10. AccSys sends the financial report | | 11. Prepare work visa with a unique visa under and associate it to the employer. (See 11a) |
|  | | 12. Sends the work visa for approval to the Immigration Officer |
| 13. Immigration Officer sends approval | | 14. System increments total visa by one for the employer (See 14a) |
|  | | 15. Inform the employer about status of application |
| **Alternative flows:**  4.a. If employer misses any information, ask for the information  6.a. if job confirmation and police report is not okay, cancel the application  7.a. If total number of work visa of Employer is exceeded, reject the application  11.a. If financial report is not good, reject the application  14.a. If Immigration officer does not approve, reject the application | | |

3)

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| **Use case Id:** | Manage Family Visa | |
| **Brief Description** | Employee applies for family visa for family members. System finds visa status of employee, calculates the income information and computes if employee can maintain his/her family with income. If income is satisfactory, it contacts police system for the criminal record of family members, computes the visa duration and get approval by the Immigration Officer | |
| **Primary actors** | Employee, Police system, Immigration Officer | |
| **Trigger(s)** | Employee initiates request for family visa | |
| **Preconditions:** Applicant should be Employee  Existing visa is valid for the employee | | |
| **Post-conditions:** Visas for family members are issued | | |
| **Normal Scenario** | | |
| Actor Action | | System Response |
| 1. Employee requests for online application form | | 2. Display the online application form |
| 3. Employee provides details of family members | | 4. Saves all information and find visa status of employee (See 4a) |
|  | | 5. Check for visa expiry and greater than 6 months (See 5a) |
|  | | 6. Retrieve income information of employee |
|  | | 7. Check if income satisfactory to maintain his/her family (See 7a) |
|  | | 8. Contact Police system for criminal record of family members of employee |
| 9. Police System sends the records | | 10. Compute visa duration based on visa of employee (See 10a) |
|  | | 11. Prepare visa with duration and a unique visa number |
|  | | 12. Sends visa for approval to Immigration Officer |
| 13. Immigration Officer sends approval | | 14. Inform the Employee about status of application (See 14a) |
| **Alternative flows:**  4.a. If information is missing, ask for missing information  5.a. If visa expiry is less than 6 months, ask employee to extend visa, terminate session  7.a. If income not satisfactory, reject the application  10.a. If police record is not okay, reject application  14.a. If Immigration officer does not send approval, reject the application | | |

4)

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| **Use case Id:** | Manage Visa Extension | |
| **Brief Description** | Applicant applies for visa extension. System computes remaining duration of visa. If duration is less than a month, applicant pays extension fees to AccSys. Visa with new duration is created. | |
| **Primary actors** | Applicant, AccSys | |
| **Trigger(s)** | Applicant initiated extension of visa | |
| **Preconditions:** Applicant should have an existing valid visa | | |
| **Post-conditions:** Visa is extended  Update the applicant’s information | | |
| **Normal Scenario** | | |
| Actor Action | | System Response |
| 1. Applicant submits visa number | | 2. Retrieves visa information |
|  | | 3. Compute and check remaining duration of visa (See 3a) |
|  | | 4. Ask Applicant to pay extension fees |
| 5. Applicant pays extension fees (DOUBT) | |  |
| 6. AccSys sends receipt | | 7. Prepare visa with new duration. |
|  | | 8. Update applicant’s information with new duration of visa |
|  | | 9. Inform Applicant about extension |
| **Alternative flows:**  3.a. If remaining visa duration is more than one month, ask applicant to apply later, end session | | |

5)

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| **Use case Id:** | Manage Visa Cancellation | |
| **Brief Description** | Applicant applies for visa cancellation. System changes visa status to cancelled, if it is a work visa system request approval from immigration officer, system inform AccSys about cancellation and notify applicant. | |
| **Primary actors** | Applicant, AccSys, Immigration officer | |
| **Trigger(s)** | Applicant wants to cancel visa | |
| **Preconditions:**  1-Valid visa exist | | |
| **Post-conditions:**  1-Visa is cancelled  2- if work visa, total allocated visa for employee decremented | | |
| **Normal Scenario** | | |
| Actor Action | | System Response |
| 1. Applicant submits visa number | | 2. Retrieve applicant visa information |
|  | | 3- Send work visa to immigration officer for cancellation approval (see 3a) |
| **4.** Immigration officer sends approval | | 5- change work visa status to “cancelled” (see 4a) |
|  | | 6- Update “applicant’s data” database |
|  | | 7- Decrement total visa allocated to employee by one (see 7a) |
|  | | 8- Inform and send cancelled visa number to AccSys |
| **9.** AccSys updates its database | | 10-Send notification about cancellation to applicant |
| **Alternative flows:**  3a. If it is not a work visa, System changes visa status to “cancelled”  4a. If Immigration officer does not approve, work visa is not cancelled  7a. If it is not a work visa, System does not decrement total visa | | |

**Question 3)**

1. **Developing Design Class Diagram**
2. **Explain briefly how you applied design principles in your class diagram**

**Question 4) Developing Sequence Diagrams**

**1)**

**2)**

**3)**

**4)**

**5)**