

This is group project and most cases team of 2 group members is formed. This project uses Python as programming environment to design build and test application that integrates database with user interface. This project is presented in four phases. Minimum requirement of this project includes:

- i) Define project scenario (having multiple use-cases) which includes collecting, saving, retrieving and processing multiple object (customers, clients, bank-account holders, students, faculty, vehicles, library membership, airline passengers, items in shopping-cart, etc.) information. Object/User activities (e.g. customers' interaction with the business, clients' activities, business-to-business application, bank-account transactions, students and course registration, faculty teaching and research activities, vehicle registration, library membership and items checkout or items returns, paying late fee for late library material return etc.) are defined and input and output activities are identified and displayed
- ii) Design of database system. Minimum requirement is to design using at least 5 main tables implemented in database. Each table will have at least 5 to 6 key values (primary, composite or combination) or important fields (one or more data types may be used). Explain the design using E-R diagrams or EERD. This section is the 'model' (in MVT architecture). Based on the scenarios or use-cases defined in part i) above, data entity (with fields) is defined in database tables.
- iii) Design UI that integrates with at least 5 to 6 different scenarios or use-cases defined in part i) above. Each activity (or use-case) is integrated with complete application. There are UI options available to initiate an activity from an integrated UI module. Based on the scenario or use-case defined above (in part i)), UI is initiated that has various widgets/UI components to support the scenario defined for this project. The UI uses different widgets or UI components including labels, entry (text box), checkbox, radio buttons, buttons, and scrollable text area. This section of the project is 'view' part (in MVT architecture)
- iv) 'Model' and 'View' planes are activated together using control (in MVT architecture) plane. As events take place in the event-driven 'view' plane, various functions perform activities in control plane to ensure execution to achieve scenarios defined in part i) above. For example, in Library Management System, when button is pressed after having radio button to select new library member, function opens a frame with the fields pertaining to adding new library member. Similarly, in the same Library Management System, when a radio button to check-out library material is selected and button is pressed, respective page opens where library member can enter membership information and the information of library material from a list of material provided (which is retrieved from the database – both membership

information and library material information). Information is validated (material is correct and library member is authenticated).

This project is implemented in **four phases**. **Phase-I** is due on **during respective Lab sessions in the week of March 13th, 2023 (lab session is on Monday, March 13th, 2023 and lab session on Thursday, March 16th, 2023)**. This phase is project scenario definitions phase and detailed project requirements definition phase. In this phase define each scenario and key features of each scenario, how it integrates to the entire project.

This is maximum two page document that explains project description and each scenario (use-case) and how each scenario (or use-case) uses database tables and associated UI to implement the scenario. Printed project report for **Phase-I** of this project (project report) is due just during the respective lab session (**respective lab session during the week of March 13th, 2023**), with title page and two page document. This phase is **5% of the course grade**. **Explain the roles that each group member plays in the implementation phase of this project, as well.**

Second phase of the project (**Phase-II**) is **due during the week of March 20th, 2023** in respective lab sessions (**lab session is held on Monday, March 20th, 2023 and the second lab session on Thursday, March 23rd, 2023.**). In this phase, demonstrate the tables are implemented in the database and all fields are defined and implemented with proper data type and submit E-R diagram (or EERD) with description of tables for this set up. You may test this phase by entering data and running queries in the database to test various scenarios and you may take screen shots of the queries and scenarios to test the outcome in the raw format. This is also **5% of the course grade**. The project report includes E-R diagram (or EERD), table description diagram, raw test cases for various scenarios (and use-cases) and the screenshots. **In the document explain role of each group member in the implementation of the tables/testing various scenarios. If changes were made in the first phase of the project, explain those as well.**

Phase-III of this project is due during the **respective lab sessions in the week of Monday, March 27th, 2023 (lab session is held on Monday, March 27th, 2023 and the second lab session is held on Thursday, March 30th, 2023)**. For this phase implement UI for the project. Entire project is implemented as an entity and from the single UI entity, multiple displays are created. In this phase, various scenarios defined in **phase-I** are transformed into user interface. The buttons perform actions and activities and functions are implemented but may not fill the fields or update database tables but are able to call functions that displays 'stub' messages. This is **5% of the course grade**. As part of the document for **Phase-III**, take screenshots of different user interfaces to represent various scenarios. **Also explain in the lab report who implemented each of the UI for this project.**

Also explain if any changes are made in phase-II of the project (database tables/fields etc.) to accommodate phase-III

Phase-IV is last phase to complete **the project and project presentation in the week of Monday, April 10th, 2023 (lab session is held on Monday, April 10th and Thursday, April 13th, 2023)**. In this phase of the project, you complete the integration of your designed architecture, which integrates View and Model part of the project. A well-documented source code is submitted as part of the project report. Take screenshot of execution of the various scenarios (and use-cases) of the application and paste it in the document. Also attach all the documentation that were submitted earlier, to create complete project report. Final presentation will be scheduled during your respective lab time **(in the week of April 10th, 2023 – lab sessions are held on Monday, April 10th, 2023 and the second lab session is held on Thursday, April 13th, 2023)** during the lab time. Presentation is not more than 10 minutes per group.

Operational project, project presentation and project report are **5% of the course grade**.

Rubric for Phase-I

- | | |
|--|-------------------|
| Identification of the problem (introduction) | – 5 Marks |
| Definition of minimum five scenarios or use-cases (separately define each scenario or use-case) and explain how it integrates to the project | – 20 Marks |
| Define tables in database associated to each scenario/use-case | – 10 Marks |
| Define fields used for each table and explain its importance associated to the scenarios defined | – 10 Marks |
| Summarize project and document role of each group member | – 5 Marks |

Rubric for Phase-II

(Based on Phase -1)

- | | |
|---|-----------------|
| Design of database tables (At least 5 tables, minimum; 5 or 6 fields, minimum per table, identification of primary key used, use of secondary key, composite keys (based on design) | 5 Marks |
| Each table design with appropriate data type, data format, identification of primary keys, NULL/NOT NULL definition, explain in your report, how does each table is aligned to your project phase 1 description | 10 Marks |
| Take screenshot of each table description and crop and paste | 10 Marks |
| E-R diagram or EERD of the system | 10 Marks |
| Based on Scenarios, enter data and test different scenarios
(Test at least 5 scenarios from your project description) | 10 Marks |

Take screenshots, crop and paste each scenario base on your project description

Summarize challenges that you had to overcome or change your initial design and reason for those changes. Also explain, contribution of each group member in the project

5 Marks

Rubric for Phase-III

(Based on Phase-II and Phase-I)

Based on scenarios or use-cases defined in Phase-I, design and implement main user interface in Python or web interface for your application. This may contain different widgets or UI components on main window. The widgets may include buttons, radio buttons, check buttons, menu options or any other widgets (e.g. Text fields, labels, text area, etc.)

Main UI

10 marks

Take **screen shot** and crop and paste the display in your lab report

Based on different scenarios, your UI will receive data to be saved in database and based on pressing of buttons or choosing other widgets/UI components, your application execute to display information based on your choice, your application pops a window either to display information or to read data from user application.

Write Python application to display child windows when any main widget or any UI component is used for execution.

Demonstrate all the Windows that will be opened under various scenarios. Explain how each window is associated to the scenarios (and use-cases) defined in previous phases

Take **screenshot, crop and paste each windows UI**

25 Marks

(5 Marks per scenario user interface)

Event driven application (executions based on pressing button/or other event based execution)

10 Marks

Summarize your report explaining if any scenario is changed or updated due to **challenges in implementation of Phase-III** of the project

5 Marks

Rubric for Phase-IV

(Based on Phase-III, Phase-II and Phase-I)

Phase-IV is due during the week of April 10th, 2023 in the respective lab sessions

(Lab session on Monday, April 10th, 2023 and the second lab session on Thursday, April 13th, 2023)

In phase-III of the project, user interface (UI) was implemented based on at least 5 scenarios defined in Phase-I of the project. In phase-II, database tables were created and were tested, independent of the UI.

Now that UI and database tables, for the application that you chose in Phase-I of the project, are implemented, final phase of the project, Phase-IV integrates UI with various database tables, based on your project problem definition.

In this phase of the project, the entire application that you defined in Phase-I is integrated to Database as well as the user interface. This completes the application with minimum 5-different scenarios (or use-cases) that are associated to your Phase-I application definition.

This completes your Model-View-Template based application.

- a) Integrate each UI with database table(s) using Python application and illustrate that one of (at least) five scenarios is implemented. Similarly, implement all (at least 5 scenarios) - explain for each scenario if there is any exclusion criteria, i.e., under which conditions the output fails?

Take the screenshot of execution of each scenario in the project and paste it in form of project report demonstrating that your project is operational.

5 Marks each

5 Scenarios

Part a) Total 25 Marks

- b) Application starts from one main application Window and logically creates multiple Windows based on choice of widgets and buttons chosen. **10 Marks**
Upload complete source code as well.
- c) Exceptions (or any conditions under which the application may fail), write notes on those conditions that would de-stabilize the application (or it may crash). How would those condition be handled? **5 Marks**
- d) What are the challenges in integrating Phase-III with Phase-IV of this project? How did you manage and handle these challenges? **5 Marks**

- e) Presentation (10 minutes demonstration showing your application works)
5 Marks