**Project Instructions:**

**Project:** Use Project 1 outline.

**Research Dataset:** Begin by creating your dataset features using the ***random*** library from Python. Look for datasets that include the necessary features and target variables for training your ML model. These details are **Gender**, **Marital Status**, **Education**, **Number of Dependents**, **Income**, **Loan Amount**, **Credit History** and others.

**Data Exploration and Pre-processing:** Once you have obtained a suitable dataset, perform exploratory data analysis (EDA) to understand its structure, distributions, and relationships between variables. Clean the data by handling missing values, outliers, and inconsistencies. Perform pre-processing steps such as feature scaling, encoding categorical variables, and splitting the data into training and testing sets.

**Develop ML Model(s):** Choose appropriate machine learning algorithms and techniques based on the nature of your project (e.g., classification, regression, clustering). Train and evaluate multiple models using cross-validation and hyper-parameter tuning to identify the best-performing model(s) for your dataset.

**Build a Web Application with DASH:** Utilize the DASH framework to develop a web application that integrates your trained ML model(s). Create an intuitive user interface with interactive components for user input and model predictions. Use HTML, CSS, and JavaScript to customize the design and layout of your web application.

**Implement Model Deployment:** Deploy your web application and ML model(s) as a web service using a platform like Render. Follow the platform's documentation and guidelines to set up the deployment environment, configure dependencies, and deploy your application to a live server.

**Testing and Validation:** Test your web application thoroughly to ensure that it functions as intended and provides accurate predictions based on user input. Validate the performance of your deployed ML model(s) by comparing predictions with ground truth labels or expected outcomes.

**Documentation and Presentation:** Document your project thoroughly, including details of the dataset, ML model(s), web application development process, and deployment steps. Prepare a presentation to showcase your project, highlighting key findings, challenges faced, and lessons learned.

**Continuous Improvement:** Seek feedback from peers, instructors, and users to identify areas for improvement in your project. Iterate on your web application and ML model(s) based on feedback and new insights gained during the development and deployment process.

**Reflection and Future Work:** Reflect on your project experience and consider future enhancements or extensions to further enhance the functionality and performance of your web application and ML model(s). Document any ideas for future research or development in your project report.

**Submission:** Submit a report of your project, including a GitHub link and Web Application link.

**Mark allocation:**

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| **Milestone 1: Business Understanding** | **30** |
| 1. Define the problem and identify the data needed | 10 |
| 1. Collect and clean the data | 10 |
| 1. Pre-process and transform the data | 10 |
| 1. Store the data in a database or file system | 5 |
| **Milestone 2: Machine Learning Model Implementation** | **30** |
| 1. Explore and visualise the data | 10 |
| 1. Develop a machine learning model | 10 |
| 1. Evaluate and refine the model - hyper-parameter tuning | 10 |
| **Milestone 3: DASH Web Application Development** | **30** |
| 1. Integration with ML Model – use ChatGPT prompt template | 10 |
| 1. Deploy locally | 10 |
| 1. Debug and fix errors | 5 |
| 1. [Deployment](https://www.render.com) as a web service ([How to deploy on render](https://youtu.be/H16dZMYmvqo)) | 5 |
| **Milestone 4: Presentation** | **10** |
| 1. Communication Skills | 5 |
| 1. Response to Questions | 5 |
| **Total** | **100** |