🚀 **Task: Build and Deploy a Machine Learning Model for Customer Churn Prediction**

🧩 **Problem Statement:**

A telecom company wants to predict whether a customer is likely to churn (i.e., leave the service) based on their usage data, contract type, and service details.

🗂️ **Dataset:**

Use the Telco Customer Churn dataset from Kaggle.

🛠️ **Task Breakdown:**

1. Data Exploration & Preprocessing

- Load the dataset using pandas.
- Handle missing values and convert categorical variables.
- Perform EDA with seaborn/matplotlib.
- Feature engineering: Create at least 2 new features.

2. Modeling

- Split the data into train/test sets.
- Train at least 3 different models (e.g., Logistic Regression, Random Forest, XGBoost).
- Use GridSearchCV or RandomizedSearchCV for hyperparameter tuning.
- Evaluate models using accuracy, precision, recall, F1-score, and ROC-AUC.

3. Model Explainability

- Use SHAP or LIME to explain key predictions.

4. Deployment

- Save the final model using joblib or pickle.
- Create a Flask or FastAPI web app with a simple HTML form for input.
- Deploy on **Render**, **Railway**, or **Hugging Face Spaces**.

🧪 **Bonus Challenges (Optional)**

- Convert the notebook to a production-ready Python script.
- Log predictions and user inputs to a file or database.
- Containerize the app using Docker.

✅ **Deliverables:**

- Clean codebase in a GitHub repo.
- Model performance report (confusion matrix, metrics).

- Public link to the deployed web app.
- README.md with instructions and screenshots.