


Phase 1: User Input Processing


Topics to Learn

- ✓ Handling structured user input (building type, area, rooms, etc.)
- ✓ Processing and storing data in JSON or a database
- ✓ Parsing user input to numerical values for AI processing

Project 1: User Input Collector

 Description: Build a system that asks users for:

- Building type (Villa, L-Shape, Apartment, etc.)
- Total area, number of floors, number of rooms
- Optional spaces (balcony, garage, garden)

 Tech Stack: Python, JSON

 Goal: Create a structured questionnaire system to store user preferences.

Phase 2: Area Calculation & Space Allocation


Topics to Learn


- ✓ Mathematical formulas for area calculation
- ✓ Room size estimation based on total area
- ✓ Graph-based room connectivity (ensuring logical placement)

Project 2: Floor Plan Area Calculator

 Description: Develop a module that:

- Calculates area distribution for rooms based on user input
- Allocates space proportionally for different room types
- Ensures minimum size constraints

 Tech Stack: Python, NumPy

 Goal: Ensure correct space allocation before AI generation.

Phase 3: Data Preparation for AI Model

Topics to Learn

- ✓ Loading and cleaning floor plan datasets
- ✓ Feature extraction (room sizes, layouts, adjacency relations)
- ✓ Creating a structured dataset for training AI

Project 3: Floor Plan Data Processor

 Description: Develop a script that:

- Extracts key features from existing floor plan datasets
- Normalizes data (scales room sizes, removes outliers)
- Stores preprocessed data for AI model training

 Tech Stack: Python, Pandas

 Goal: Prepare a structured dataset for training AI.

Phase 4: AI Model for Room Placement


Topics to Learn

- ✓ Artificial Neural Networks (ANNs) for room arrangement
- ✓ Graph Neural Networks (GNNs) for room connectivity
- ✓ Constraint-based optimization for realistic layouts

Project 4: AI Room Arrangement Model

 Description: Train an AI model that:

- Takes user input + dataset features
- Predicts room positions based on adjacency rules
- Outputs a structured floor plan (grid format or coordinate-based)

 Tech Stack: Python, TensorFlow/PyTorch

 Goal: Develop AI logic for realistic room placement.

Phase 5: AI Model for Floor Plan Generation


Topics to Learn

- ✓ Generative Adversarial Networks (GANs) for layout generation
- ✓ Autoencoders for improving layout realism
- ✓ Combining AI-generated layouts with predefined constraints

Project 5: AI Floor Plan Generator

Description:

- Train an AI model that generates entire floor plans
- Ensures logical room connectivity
- Adjusts layouts based on user preferences

 Tech Stack: Python, TensorFlow, GANs

 Goal: Generate complete floor plans with AI.

Phase 6: Exporting Floor Plans to PDF, DWG, DXF


Topics to Learn

- ✓ Generating vector-based floor plans
- ✓ Converting AI-generated layouts to CAD-compatible formats
- ✓ Exporting outputs to PDF, DWG, and DXF formats

Project 6: Floor Plan Export Module

Description: Build a script that:

- Converts AI-generated layouts into a structured format
- Exports floor plans in PDF, DWG, and DXF
- Ensures CAD compatibility for further modifications

 Tech Stack: Python, ReportLab (PDF), ezdxf (DXF), CAD libraries

 Goal: Create final outputs in multiple formats.

