GOOD MORNING!
早上好!
안녕하세요!

DAY 4

DAY 1 (DONE)

- Welcome
- Project Introduction
- Introduction to Project Development Process
- Business Requirement Development
- System Requirement Development
- System(High Level) Design
- Time Management

DAY 2 (DONE?)

- YOLOv8 기반 데이터 수집/학습/deploy (Detection Alert)
  - 감시용 데이터 수집(bus, truck, tank 등)
  - 감시용 데이터 라벨링
  - YOLOv8 기반 학습
  - YOLOv8 Object Detection
- Porting to ROS
  - Create Detection Alert Node
  - Generate Topics to send image and Obj. Det. results
  - Create Subscriber node and display image and print data from the Topic

DAY 3 (DONE?)

- AMR (Autonomous Mobile Robot)기반 카메라 인식 autonomous driving 시스템 with obstacle avoidance 구축 (AMR Controller)
  - Digital Mapping of environment
  - Goal Setting and Obstacle Avoidance using Navigation
  - Object Tracking w/ AMR camera
  - Control logic between navigation/obj. tracking/ obj. following (teleop)
- Porting to ROS
  - Create AMR Controller Node
  - Create and send Obj. Tracking Image and data to Sysmon
- And finally, Integration and Test of Detection Alert & AMR Controller

DAY 4

- Flask 를 이용한 웹 서버 구축 (System Monitor)
  - Flask/HTML Intro
  - Deploy YOLOv8 Obj. Det results to web
  - Log in 기능 구현
  - Sysmon 웹기능 구현
  - 알람 기능 구현
- SQLite3를 이용한 데이터베이스 구축 및 연동 (System Monitor)
  - SQLite3 기본 기능 구현
  - DB 기능 구축
  - 알람이 울리는 경우 DB에 저장하는 기능 구현
  - 저장된 내용 검색하는 기능 구현

DAY 4

- Porting to ROS
  - Update Sysmon Node code
  - Update the database with received Obj. Det. Data from Detection Alert Node
  - Display the content of DB on System Monitor web page

- And finally, Integration and Test of Detection Alert, AMR Controller & System Monitor

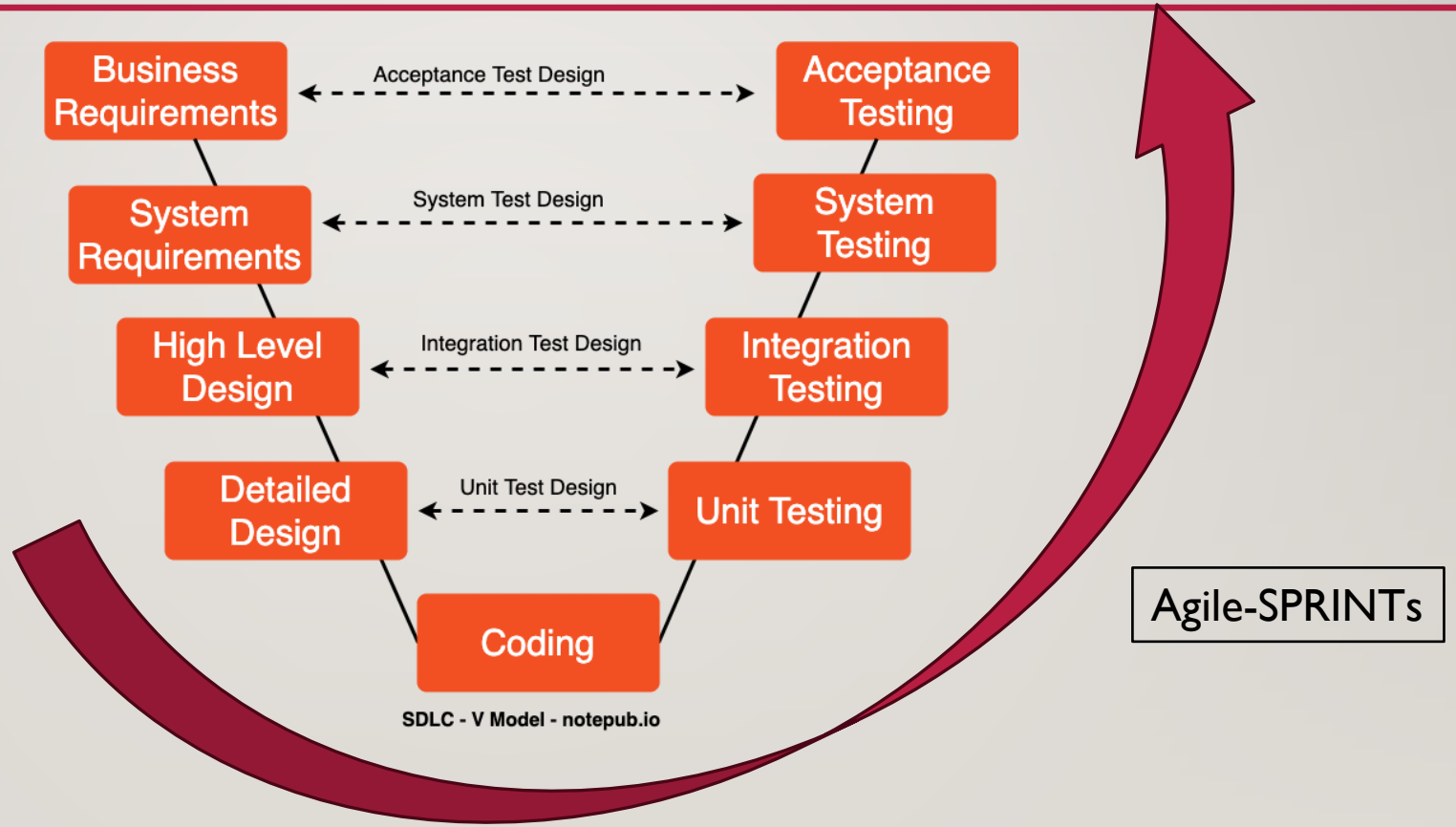
DAY 5

- 감시시스템 통합 구현
  - - 전체 시스템 통합 운용
- Team Demo & Presentation
- 평가 시간

프로젝트 RULE NUMBER ONE!!!

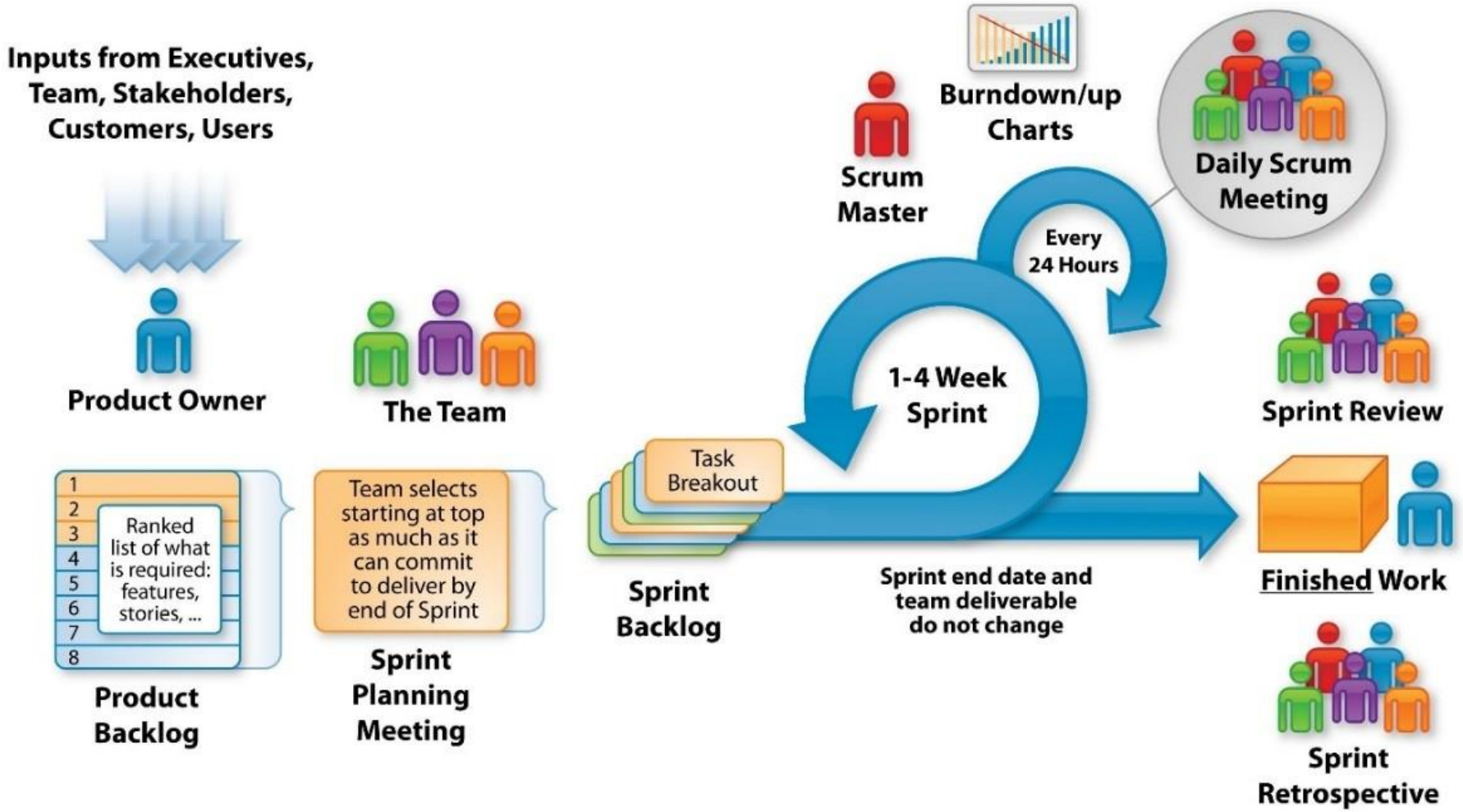
Have Fun Fun Fun!

SW DEVELOPMENT PROCESS



Agile-SPRINTs

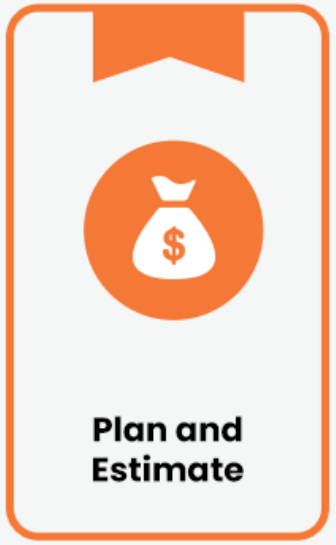
The Agile - Scrum Framework



5 Stages of Scrum Sprint

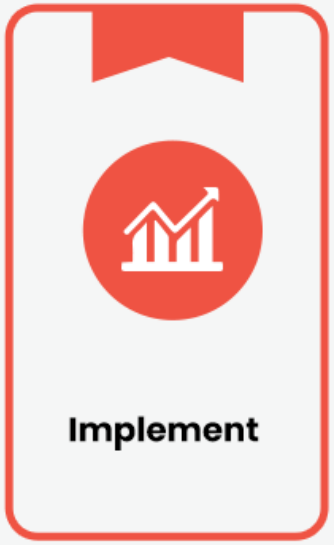
Initiate

This phase includes the processes related to the commencement of a project, such as a scope and objectives, creating and distributing its charter, and taking other steps to guarantee success.



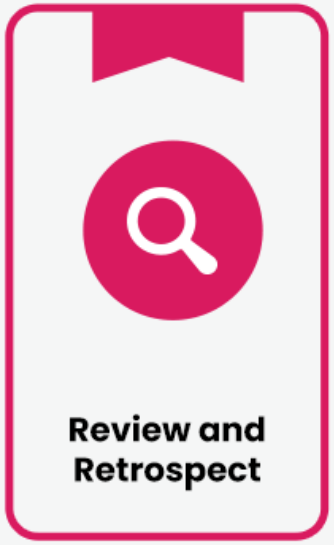
Plan and Estimate

This phase involves planning and estimating processes, including creating user stories, approving, assessing, committing user stories, creating tasks, evaluating tasks, and creating a Sprint backlog.



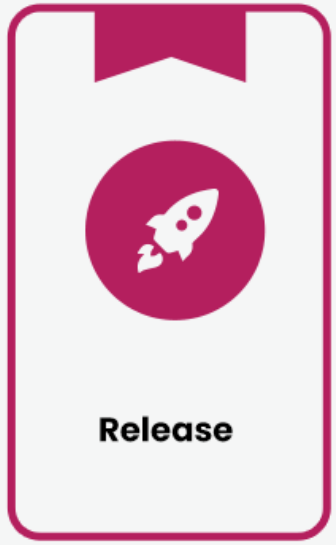
Implement

This phase is about executing the tasks and activities to create a product. These activities include building the various outputs, conducting daily standup meetings, and grooming the product backlog.



Review and Retrospect

This stage of the project lifecycle is concerned with evaluating what has been accomplished so far, whether the team has worked to plan, and how it can do things better in the future.



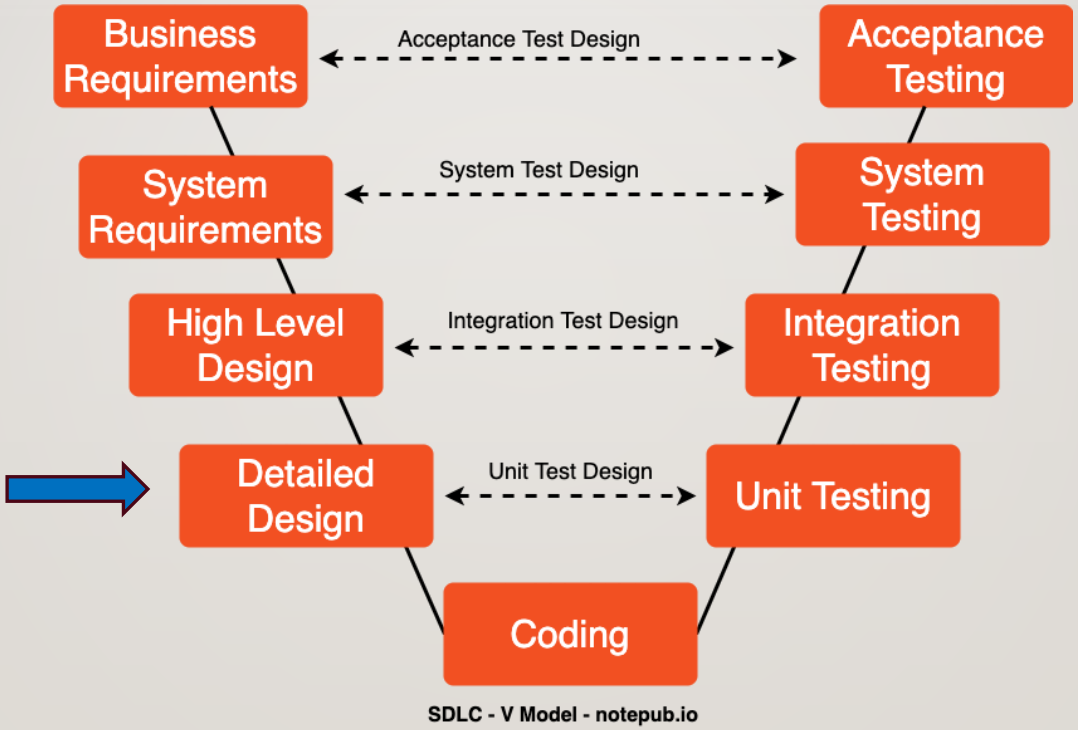
Release

This stage highlights delivering the accepted deliverables to the customer and determining, documenting, and absorbing the lessons learned during the project.

Copyright © 2021 Maruti Techlabs Inc.

maruti techlabs

SPRINT 2 – AMR CONTROLLER



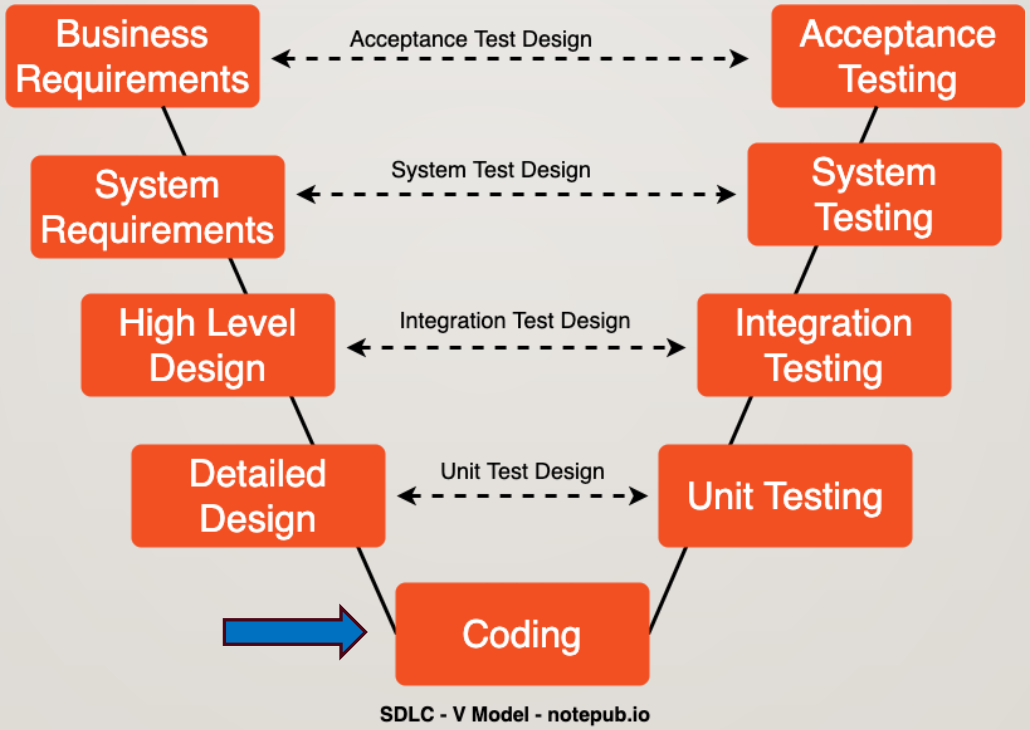
TEAM EXERCISE 6

Perform Detail Design of AMR Controller Module using Process Flow Diagram

DETAIL DESIGN REVIEW BY EACH TEAM

Using the process flow diagram present team's design

SPRINT 2 – AMR CONTROLLER



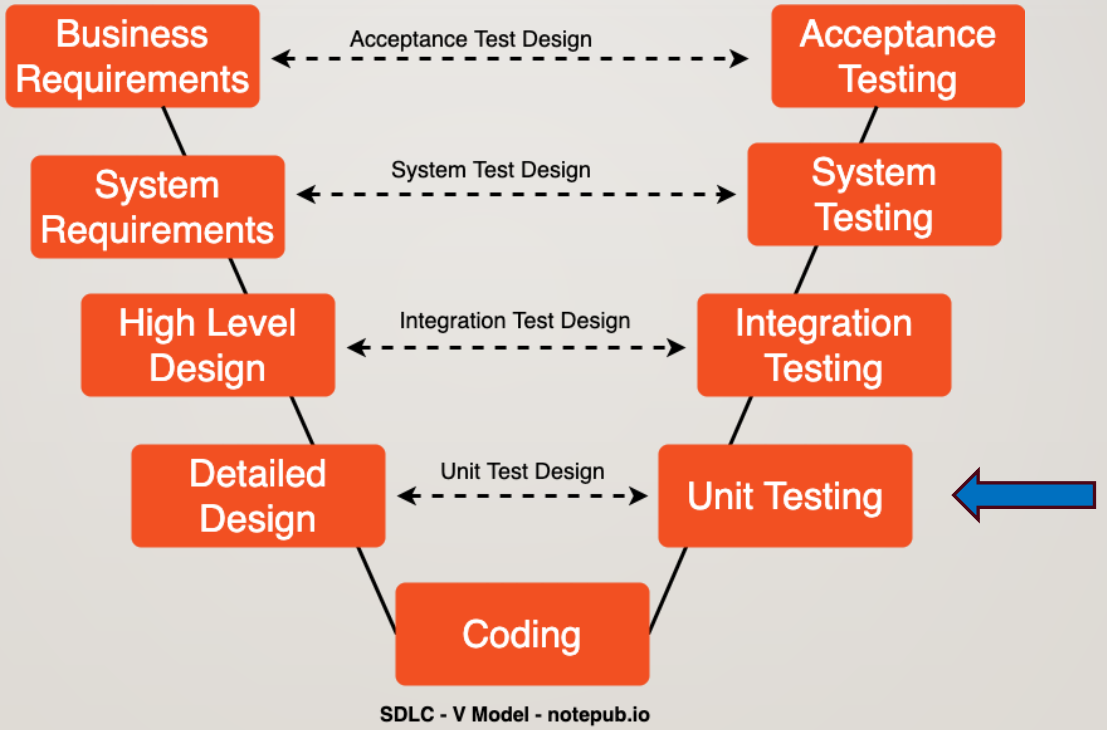
CODING HINT

- Initial Pose
  - nav2
  - rviz2 – 2D estimate pose
  - ros2 topic echo /initialpose
- Sending Goals
  - nav2
  - Rviz2 – send goals
    - ActionClient
    - NavigateToPose
  - ros2 topic echo /amcl_pose
- Stopping Navigation
  NavigateToPose.cancel_all_goals_async()
- Sending multiple goals
  - ActionClient
  - /follow_waypoints
- Manual control of AMR Odometry
  - /cmd-vel

EXPECTED OUTCOME

AMR navigates to avoid obstacles, ignores dummies, track, and follow target

SPRINT 2 – AMR CONTROLLER



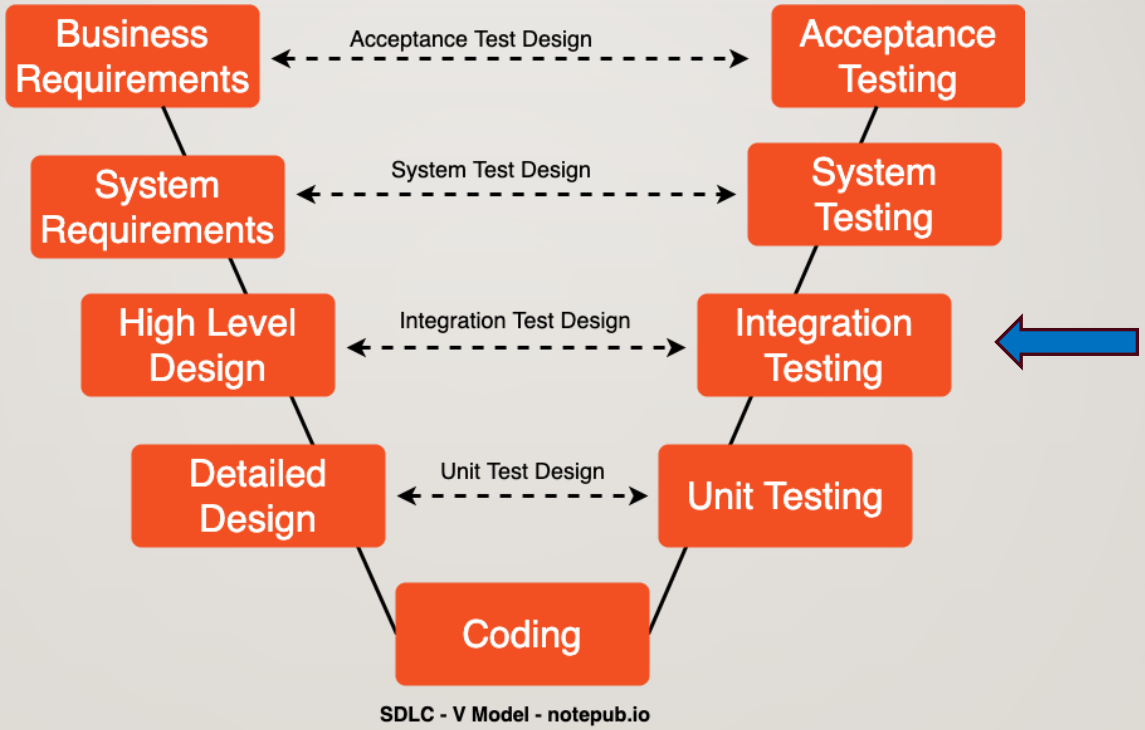
TEAM EXERCISE 7

Perform coding and testing of AMR Controller Module

RESULTS & CODE REVIEW BY EACH TEAM

Show actual results against the expected results and explain the code generated

SPRINT 1&2 – DETECTION ALERT/AMR CONTROLLER INTEGRATION & TEST



EXPECTED OUTCOME

- Detection Alert and AMR Controller able to pass topics for necessary actions between

TEAM EXERCISE 8

Perform integrate and test of Detection Alert and AMR Controller Modules

RESULTS & CODE REVIEW BY EACH TEAM

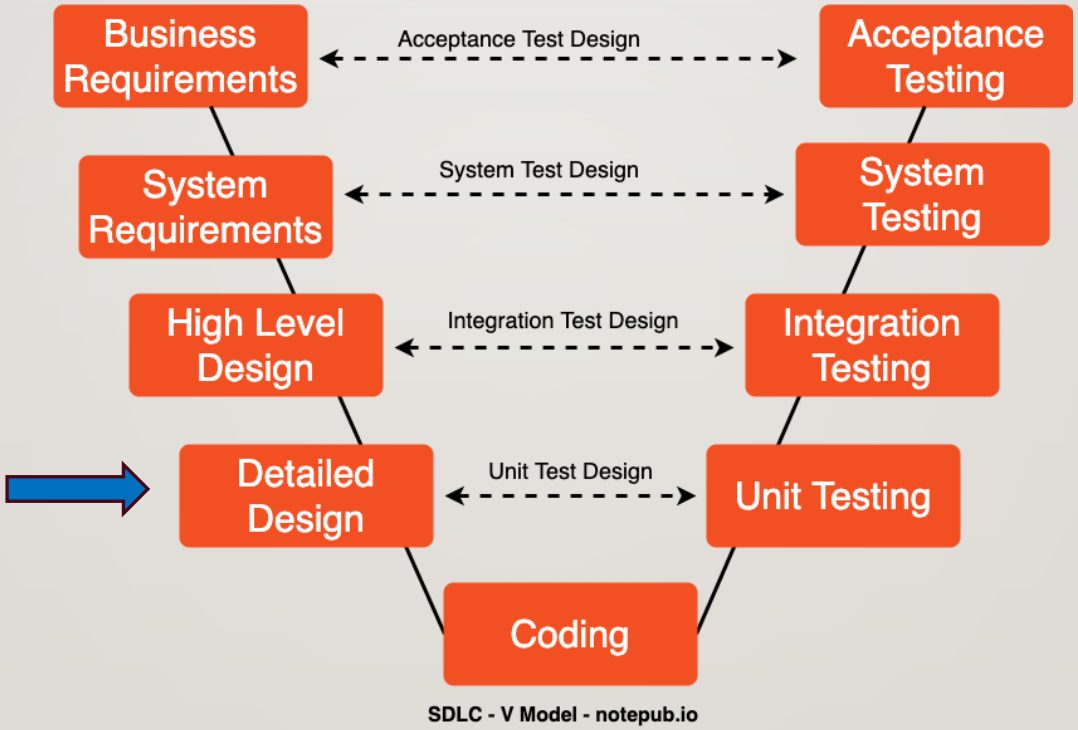
Show actual results against the expected results and explain the code written

PROJECT SPRINTS

- Detection Alert
  - Camera Capture
  - Object Detection
  - Send messages to other subsystems
- AMR Controller
  - Receive messages and act accordingly
  - Move using (SLAM) with Obstruction avoidance
  - Target Acquisition (Obj. Det.) and Tracking
  - Follow target using camera and motor control
- System Monitor
  - Receive and Display Detection Camera and info
  - Receive and Display AMR Camera and info
  - Store, display, and report Information and Alerts

SYSTEM MONITOR SPRINT

SPRINT 3 – SYSTEM MONITOR



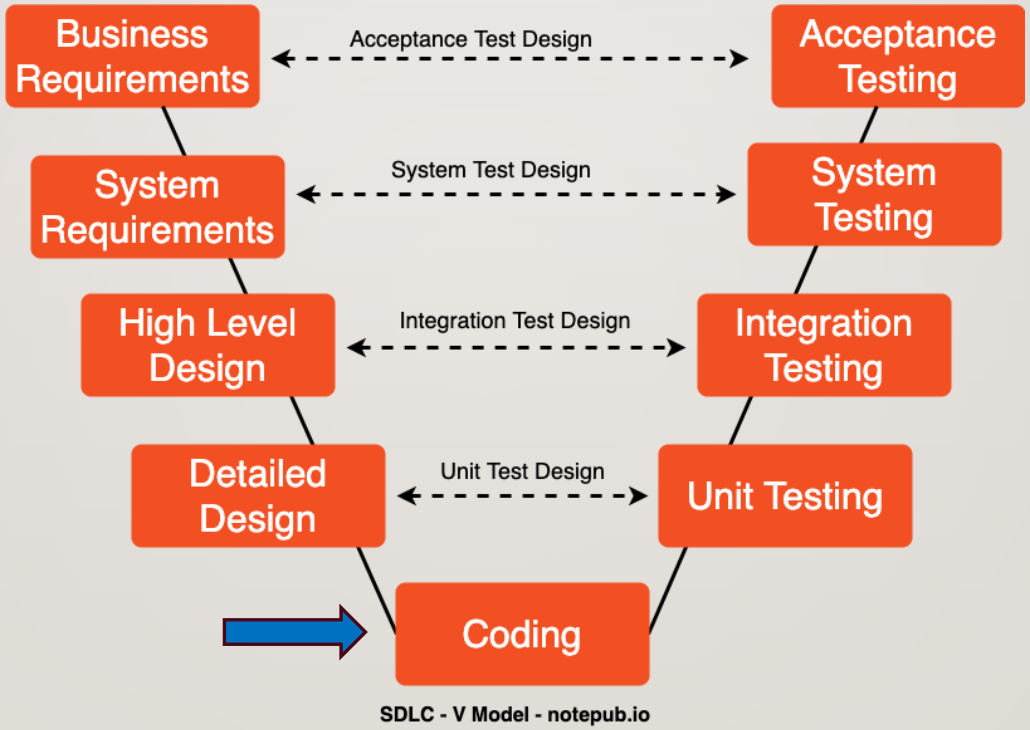
TEAM EXERCISE 9

Perform Detail Design of System Monitor Module using Process Flow Diagram

DETAIL DESIGN REVIEW BY EACH TEAM

Using the process flow diagram present team's design

SPRINT 3 – SYSTEM MONITOR



CODING HINTS

- Flask Basic Review
- SQLite Basic Review
- Webpage
  - Login page
  - Two video window
  - Alert Report
    - Status Captured and Following
- Database – SQLite
  - Login Data
  - Status Data

INTRODUCTION TO FLASK

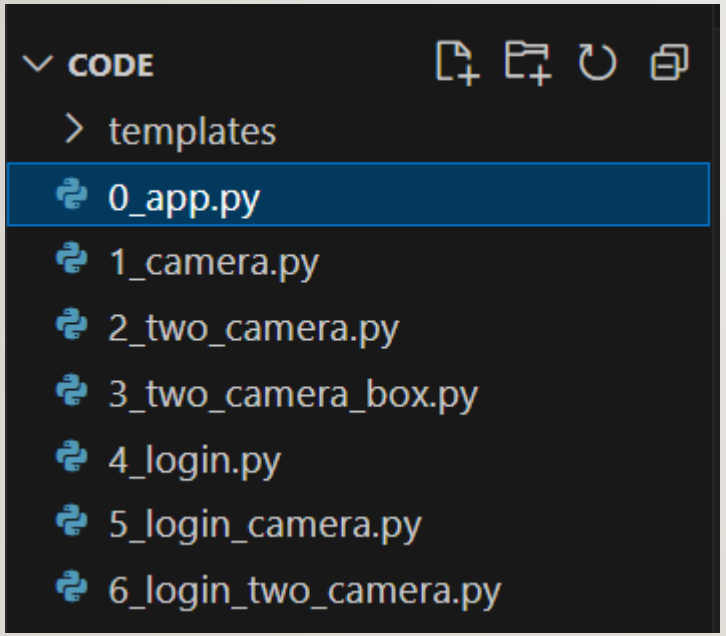
- What is Flask?

  A lightweight web framework for Python.
- Why Flask? Simple, flexible, good for beginners and small projects.

- pip install Flask

- <project>/
- ├ app.py # Main Flask application file
- └ templates/ # Folder for HTML templates
  - └—— index.html

FLASK HINTS



- HTML Reference:

  HTML elements reference - HTML: HyperText Markup Language | MDN

  https://developer.mozilla.org/en-US/docs/Web/HTML/Element

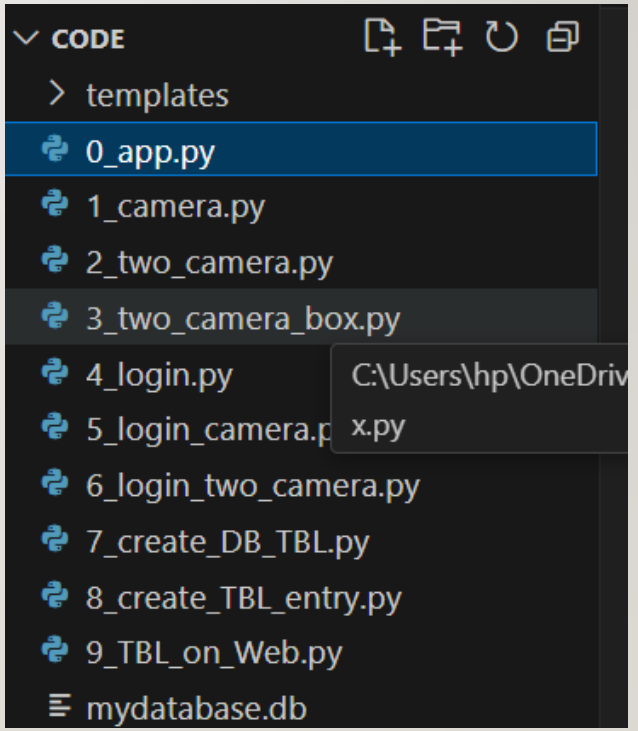
- CSS

  CSS: Cascading Style Sheets | MDN

  https://developer.mozilla.org/en-US/docs/Web/CSS

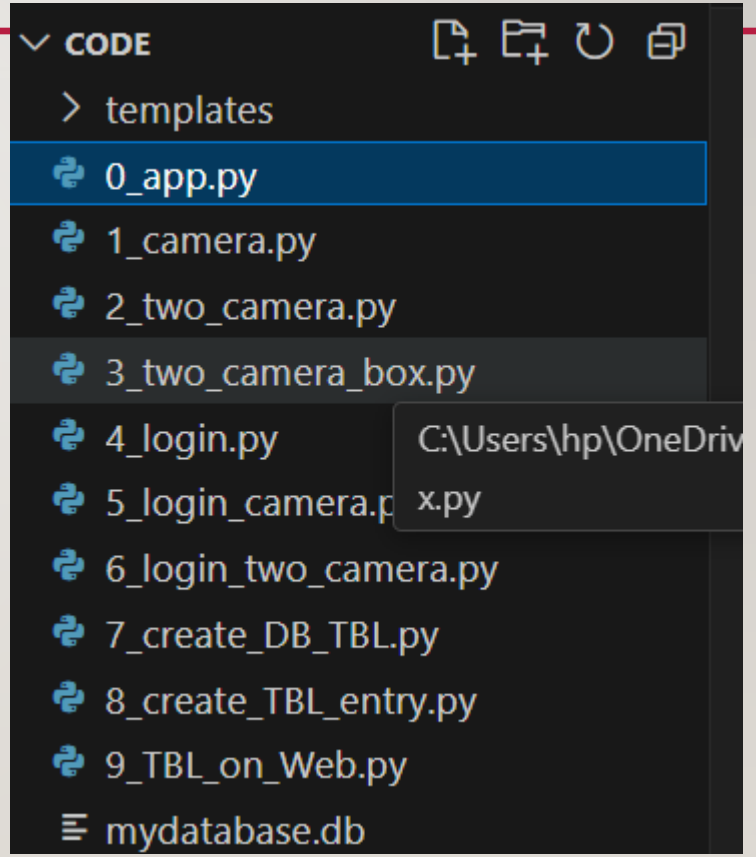
CODING HINTS

- Flask Basic Review
- SQLite Basic Review
  - SQLite is a lightweight, self-contained, serverless SQL database engine.



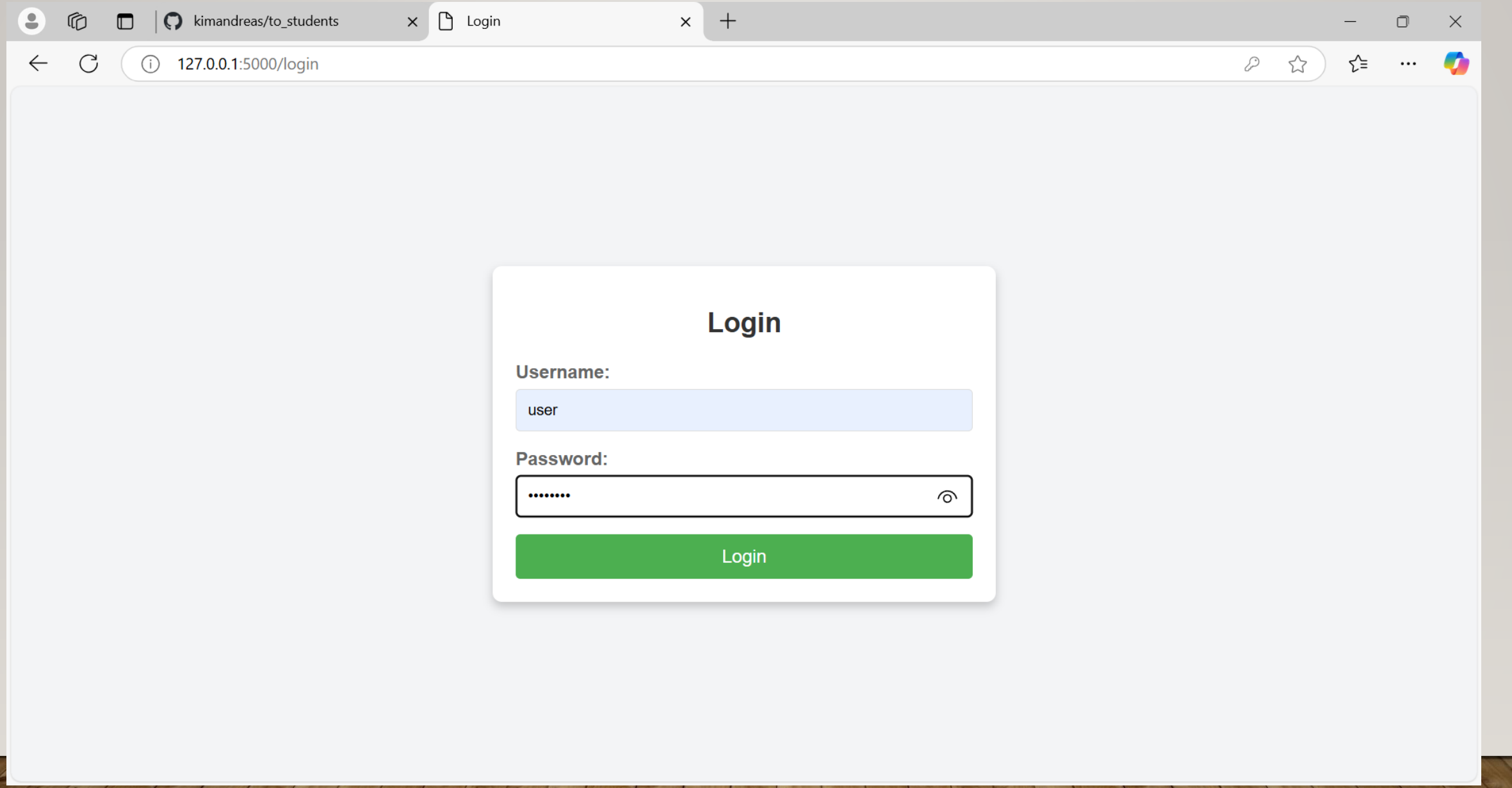
CODING HINTS

- Flask Basic Review
- SQLite Basic Review
- Webpage
  - Login page
  - Two video window
  - Alert Report
    - Status Captured and Following
- Database – SQLite
  - Detection Alert Data



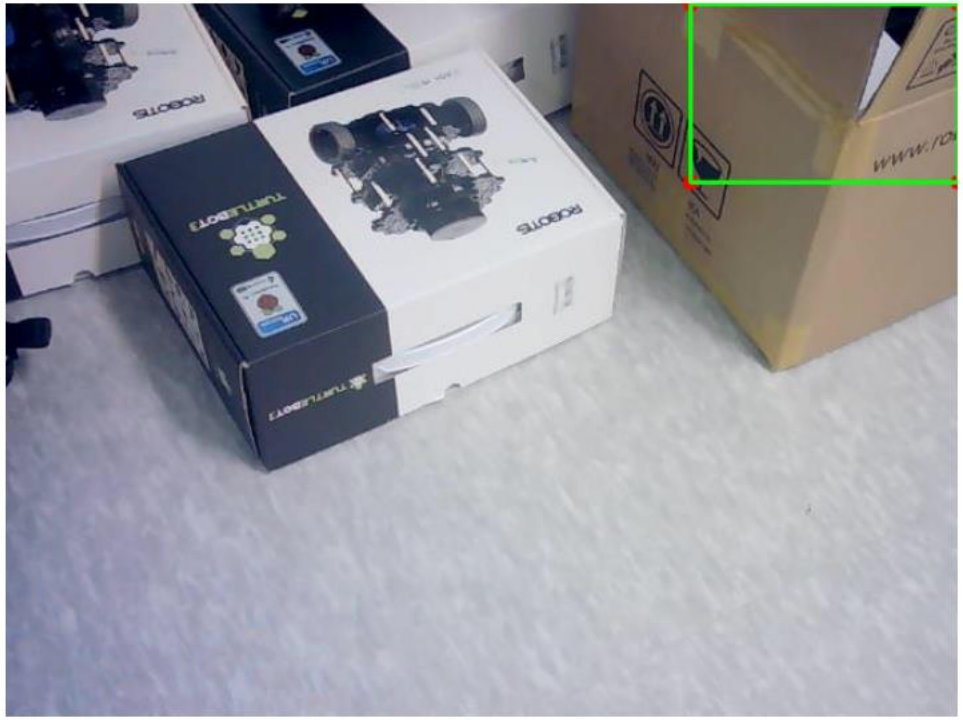
CODING HINTS

- Database – SQLite viewer
  - sudo apt install sqlitebrowser
  - VSCode sqlite viewer extension


kimandreas/to_students
Login
127.0.0.1:5000/login
Login
Username:
user
Password:
Login

Welcome, user!

You are now logged in.



Violations Detected

ID	Name	Date & Time
0	Truck	2024-11-06 10:30:22

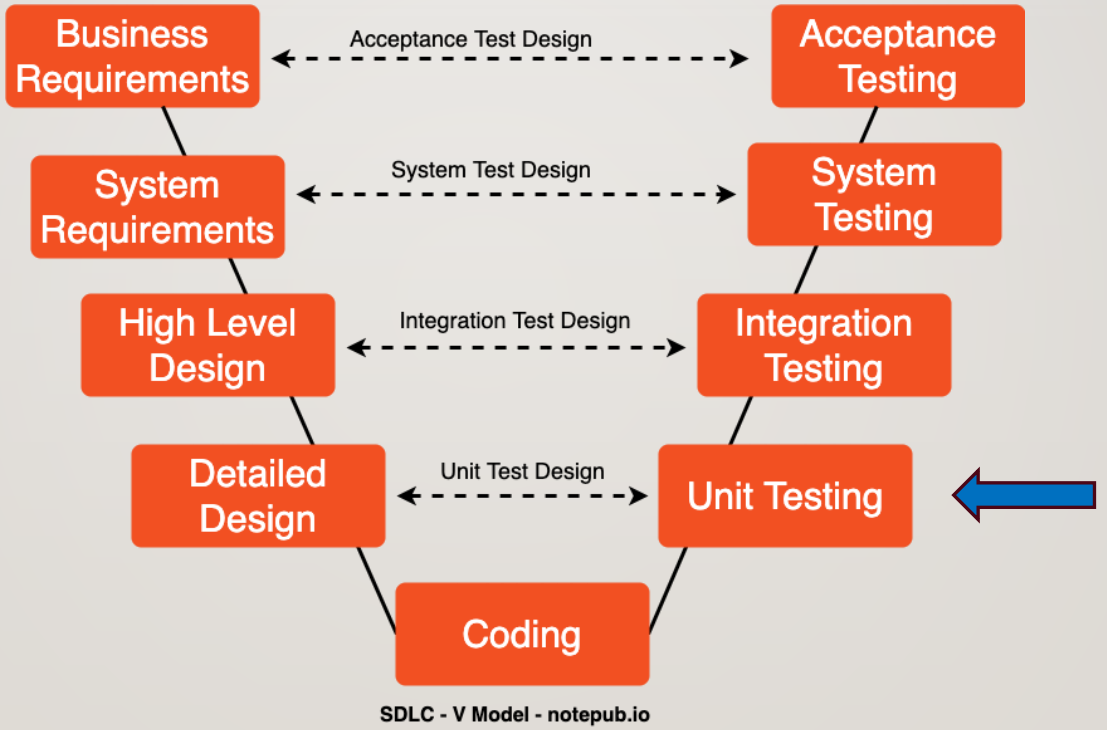
Track and Following

ID	Name	Date & Time
1	Dummy	2024-11-06 10:30:22

EXPECTED OUTCOME

- Sysmon with two windows and related Detection and tracking info
- ROS Nodes, Services, Topics

SPRINT 3 – SYSTEM MONITOR



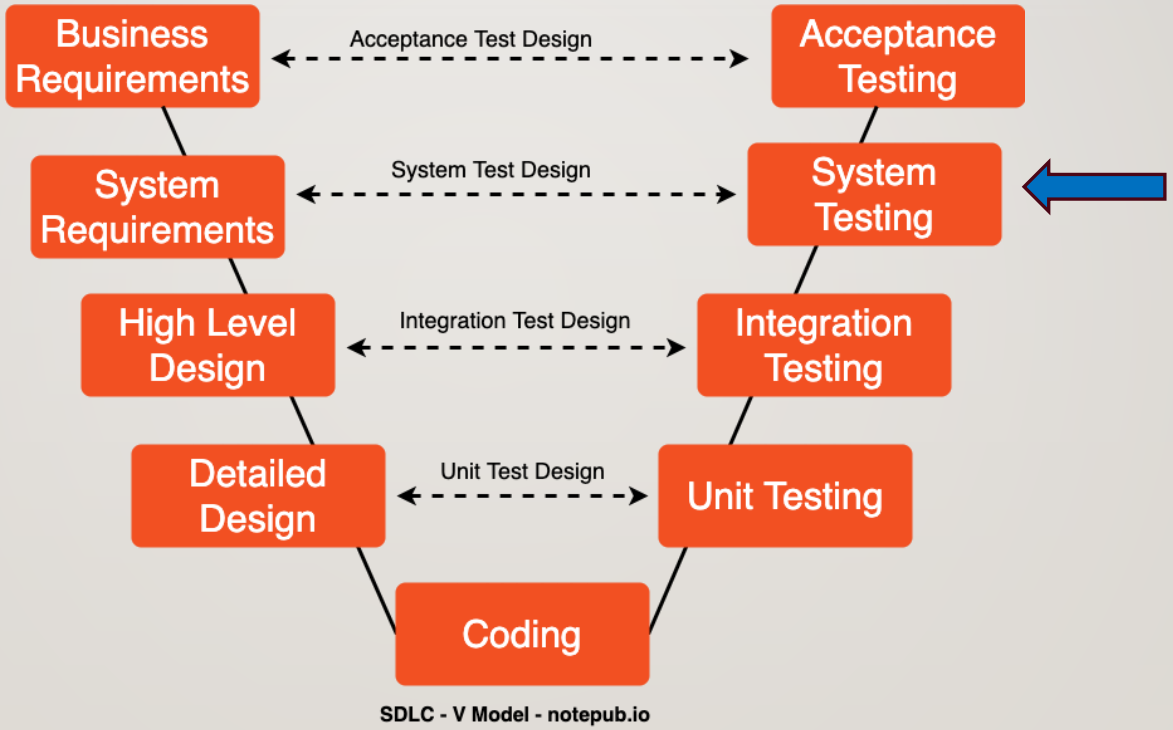
TEAM EXERCISE 10

Perform coding and testing of System Monitor Module

RESULTS & CODE REVIEW BY EACH TEAM

Show actual results against the expected results and explain the code written

SYSTEM INTEGRATION & TEST



THE LAST DAY

- 9:30 – 4:00 p.m
  - System Integration & Test
  - Final Presentation Prep
- 4:00 – 5:40 p.m.
  - Live Demonstration 5 minutes
  - Presentation 15 minutes
- Equipment Return and Rap up

최종 프로젝트 발표

FINAL PRESENTATION MATERIAL PLANNING

- Solution Overview
- Key Issues and Challenges
  - How did you overcome
- Required Solution Improvements
- Lessons Learned
- Team Contribution

- 20 minutes

팀원 과 업무 책임

- 업무 책임
  - …
- 숙련된 기술
  - ….