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Team Members: Reia Menezes, Salma Riaz, Akansha Bhatia

MISIS: M00791121, M00982503, M00975443

Course: MSc Robotics

Module: PDE4435 – Robot Integration System

Assessment: Coursework 2 - Logbook

Professor: Dr. Judhi Prasetyo

**Date: 19/03/2025 - Wednesday**

The group scheduled a meeting to discuss the coursework 2 plan of action for Friday, 21st March 2025 at 14:45.

**Date: 21/03/2025 - Friday**

The meeting agenda:

* Discuss the report
* Divide the work of RoboDK, IEEE Report, logbook, and the Python GUI.
* Finalize project scope to share on teams with Dr. Judhi to get feedback before proceeding.

After the meeting, the following was decided.

* Akansha and Salma would take care of RoboDK, tasks divided:
  + Akansha:
    - Import table and robot (chosen and approved by the whole team)
    - Tool Change
    - Stirring Motion
    - Folding Motion
  + Salma:
    - Platform to keep ingredients and shelfs (shapes), and utensils (bowl).
    - Program OpenCV to detect ingredients and utensils using color.
    - Picking detected objects
    - Placing objects
* Reia would handle the GUI
  + Create a GUI using python tkinter.
  + Add the features as discussed with the group.

Set a meeting for Tuesday 25th March 2025, to track progress at 19:30.

**Date: 22/03/2025 - Saturday**

Akansha began working on RoboDK and, along with Salma, faced free license issues. After Akansha checked out the old chats for PDE 4431 and found old license keys resulting in RobotDk working with limited access.

**Date: 23/03/2025 - Sunday**

Akansha finished her parts of

* Adding the robot and table
* Finished adding toolbox along with program for attaching and detaching tool
* Finish adding 2 cooking actions and program for them

Akansha sent the file to the group chat for Salma to work on.

Salma worked on the given file where she

* Added shelfs, objects to act as ingredients, shapes to act as stove.
* Points of positions to pick and place each object were taught.
* Programmed the picking, pouring and placing of ingredients

The final file was re-shared.

**Date: 24/03/2025 - Monday**

Reia began working on the GUI.

* Set the time and date to change dynamically on the screen.
* Connected the RoboDK program to the Python Application
* Created a ‘stir’ dummy button, to ensure the program was connected and working

The group discussed the creation of a recipe and asked Salma to add a table with bowls.

**Date: 25/03/2025 - Tuesday**

Salma added the bowls table and taught her points and programmed the process of picking the bowl and placing the ingredients on top of it.

The file was again reshared.

Based on the new file, Akansha was asked to reteach her points.

Reia completed the GUI with the following dummy features:

* Favorites
* Recipe Database
* Places to Eat
* Timer
* Random Recipe
* Return Home
* Emergency Stop

Progress video of the GUI was screen recorded and shared with the group.

Upon discussion, the group decided to change the orientation of the toolbox, to prevent any errors from occurring,

Akansha completed the reteaching of her points and changed the orientation of the toolbox.

The file was reshared.

**Date: 26/03/2025 - Wednesday**

Reia ensured the RoboDK file was updated from the old one to the latest one shared by Akansha.

Reia reached out to Dr. Judhi for a feedback/consultation call with the group at 15:00.

Reia completed all the features and ensured they were all working, sending the progress to the group.

The group received feedback from Dr. Judhi regarding our simulation. Asked the group to start focusing on the report now and provided insights into what needs to be added.

After receiving feedback, the group gathered for a quick Teams meeting to discuss and review the feedback received.

The team decided to add two robotic arms, however, when Akansha started adding the second robot, she faced the license issue restricting that and emailed Dr. Judhi

Reached out to Dr. Judhi and Mr. Bittu regarding the same.

Salma reached out to the officials in RoboDK but no help was provided regarding the license.

**Date: 27/03/2025 - Thursday**

Dr. Judhi shared a report sample with the group for reference.

The group decided to schedule a meeting on Friday, 28th March 2025 to discuss and then divide the parts of the report.

**Date: 28/03/2025 - Friday**

Reia created a GitHub repository and added Salma and Akansha as collaborators.

The meeting concluded with the following plan for feedback:

* Abstract + Keywords
* Intro
* What Control System Include
  + User manual & Instructions Given
  + Components included
  + Recipe database & Favorites
* What Control System does
  + Automated Cooking Process
  + Filling Up Customized Cupboards
  + Tablet Interface & Sensors
* Simulation & Integrations
  + Scope of Work - Requirements
  + Components - Brand Options
  + Simulations Pictures - Explanation
* Conclusion
* Future Research

The plan was shared for feedback with Dr. Judhi, based on the feedback received from him the group formulated a new structure.

**Date: 29/03/2025 - Saturday**

Updated report layout shared by Akansha:

* Abstract
* Introduction + Problem being faced
* Designing control system + requirements
* Selection of components + integrations (including sensors)
* Building simulation + challenges
* Conclusion
* Further implications

**Date: 30/03/2025 - Sunday**

Reia and Salma agreed with the report layout. The group divided the parts.

* Abstract - Reia
* Introduction + Problem being faced - Salma
* Designing control system + requirements - Akansha
* Selection of components + integrations (including sensors) - Reia
* Building simulation + challenges - Salma
* Conclusion - Akansha
* Further implications – Akansha
* Others:
  + Video Demonstration – Reia
  + GitHub – Reia
  + Logbook – Reia + Updating - Salma

The group decided to finish the report by Friday 4th April, to receive feedback during the makeup class on Saturday, 5th April 2025.

Akansha created the Google Docs sheet with all the report parts written and shared the same with the group.

**Date: 02/04/2025 - Wednesday**

Reia created a Google Slides presentation slide along with Overleaf file and shared the same with the group.

Reia completed the GitHub commits and updated the ReadMe file.

Reia worked on the logbook.

Salma proofread the logbook and added any parts Reia forgot about.

**Date: 03/04/2025 - Thursday**

In RoboDK, Salma programmed with Python and OpenCV and placed a camera on the robot gripper for the robot to detect the object color(different color is provided to indicate different ingredients). Upon detection of required color(ingredient) only then the robot picks the object.

Salma shared the updated logbook, RoboDK file, and a video of how the program runs in the simulation.

**Date: 04/04/2025 – Friday**

Akansha added a second tool in the simulation along with the programming of attach and detach of the tool.

Akansha added the whisking and flipping motion using the second tool and shared the updated RoboDK file with the group.

**Date: 06/04/2025 – Sunday**

Akansha finished the control system design in report along with researching technical details of each component and communication with each other (14 citations added)

Akansha finished the conclusion and further implication section in report.

Akansha updated the logbook and shared it with the group.

**Date: 07/04/2025 – Monday**

Salma added the introduction to the report.

Reia added the Abstract and Index terms, completing the report.

The final report was uploaded on Git Hub and shared with the group to proofread.

Reia ensured the following things had been uploaded to GitHub:

* **Images**: a folder containing all the interface screenshots
* **PDE4435 SIM Final**: the RoboDK simulation file.
* **Coursework2\_report\_pde4435.pdf**: an IEEE format report on this coursework.
* **Cw2\_logbook.docx**: completed logbook report for this coursework.
* **Homekitchenrobotgui.zip**: the zip folder containing the code for this software-based simulation.
* **PDE4435-Home Kitchen Robot – CW2.pdf**: the pdf version of the PowerPoint slides that will be used for the presentation.
* **Readme.md**: a file that explains how to run the code and contains the YouTube video demonstration link.

**Date: 08/04/2025**

Reia made minor tweakings to the code, to enhance the GUI.

Reia added the necessary comments in the code.

Reia made the contribution table and shared it with the group to get feedback.

Reia sent the group report for feedback to Dr. Judhi.

**Date: 09/04/2025**

Dr. Judhi shared feedback with Reia

**Date: 10/04/2025**

Reia shared the positive feedback with the group and got approval for the contribution sheet.