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**First week group meeting**

*Date:*Thursday, 23 February 2023, 19: 00 PM-20: 00 PM

*Purpose:* Identify group members

*Procedures:*

1. During the first week of class, I sat in the Liren Building classroom and listened intently as the teacher outlined the guidelines for this group assignment.

2. Classmates and I spent an hour after class debating and adjusting the team members in each major( including IE, ME and CE) to form a fair and cohesive team.

*Results:*We set our ten members from three majors: four IE majors, four CE majors, and two ME majors.

*Conclusion and suggestions for future experiments:*After confirming the division of labor，our team members and I should read the tasks and requirements of the project for this semester carefully and confirm the division of labor among members during the next week.

*Recorded by:* Gu Xingci

**Second week group meeting**

*Date:*Tuesday, 28 February 2023, 16: 15 PM-18: 00 PM

*Purpose:* Determine team members' distribution of labour

*Procedures:*

1. Firstly, our team members and I clarified the project's goals and timeline. Our aim was to programme a robot to carry out a series of operations and complete two patios’ activities, each with three tasks.

2. We started with both patio1's and patio2’s tasks, deciding that our team needed to confirm the construction of our rover model system before moving on to the pathfinding process of the initial goal. At this point, everyone started introducing the parts they are good at, for example, Chen Xi said he is suitable for the control module based on the servo principle; Yang Chun said he is suitable for handling the openmv vision processing module; and Yuan Ye said he is good at building the system's framing.

3. After that, we confirmed the initial roles assigned to each member of the group, Sun Linhan, Guo Linhong, and Zou Hanlin were all working on PCB and document integration. In this group, I was in charge of writing notebook and initial report. Chassis and tyres were Sheng Dian's domain. Motor maintenance is within the purview of Chen Xi. Li Chenghao and Liu Cehan was in charge of the communication between modules and adjust clock frequency. The OpenMv module was developed by Yuan Ye, and Yang Chun.

4. Finally, we identified The timing of the initial project report, notebook and intermediate evaluation to ensure that the content of these sections was submitted on time.

*Results:* We confirmed the initial division of labour among the group members, and verified that everyone had an appropriate division of labour and was capable of completing the mid-term progress assessment successfully.

*Conclusion and suggestions for future experiments:* Following a week of clarifying roles and responsibilities, everyone would began working on their assigned tasks this week, with a plan to report and integrate the system at the same time next week.

*Recorded by:* Gu Xingci

**Third week group meeting**

*Date:*Wednesday, 8 March 2023, 13:00 PM-16: 15 PM

*Purpose:* First week’s progress reports and system integration

*Procedures:*

1. To start, Chen Xi gave a detailed briefing on motor, explaining that he had purchased a motor and tweaked its module to better regulate the robotic arm's motion. He also recommended that, once everyone had finished their individual reports, the team’s group members should go on to completing their group reports.

2. Followed that, the PCB integration team led by Sun Linhan, Guo Linhong, and Zou Hanlin stated that they would try to convert the Arduino code to STM32 to meet course requirement. As the two chips' design and programming language were different, they needed to make some adjustments to guarantee the code's correctness and stability.

3. Li Chenghao and Liu Cehan, who were in charge of communication, said that two key parts of their current effort were fixing RTCs and transferring data via HC12. Among these was real-time clock debugging, in which they were trying to utilise a Nucleo-L432KC chip to retrieve the time over the I2c protocol.

4. Yuan Ye and Yang Chun, who were in charge of the OpenMv module, said that they first conducted a field trip to the pavement conditions of our school's East Lake, and Sheng Dian also went to confirm the terrain conditions to ensure that the chassis and wheels of the rover he designed could maintain a smooth progress on gravel ground and flat stone pavement.

5. After all group members debriefed, everyone focused on the problem of how to identify road signs in task 2.1. There are currently two schemes to achieve the recognition of arrows through machine learning algorithms, and the other is to directly identify triangles and rectangles; the final result of the discussion was the former. It was decided to ensure the basic functions of the rover to complete the task of midterm display. Secondly, every team members was concerned with finishing task 2.2, which entailed throwing small balls, using the motor to operate the robotic arm and also had requirement of the 3D printer arm. The current discussion was led by Chen Xi to finish the content of the servo, while Sun Cehan and others were responsible for assisting modelling and finishing the task of 3D printing of the robotic arm. Finally, I wrote everyone's report in detail on the electronic notebook in order to find everyone's corresponding progress and make timely adjustments.

*Results:* Modules have been developed for the project, and our team discussed system integration. Everyone on the team known what he needed to do to move his part of the project forward.

*Conclusion and suggestions for future experiments:* The robot's system building was taking shape. This week, team members should continue develop the partially assembled modules they were accountable for and talked to each other about the coordination and communication issues arisen between the modules.

*Recorded by:* Gu Xingci

**Third week day-to-day progress：**

*Purpose:* Improve each group's modules

*Date*: Friday, 10 March 2023.

*Purpose:* Adjust the communication content of each module by communication team members, including Li Chenghao and Liu Cehan.

*Procedures:*.

1. To lessen the burden on the main control's memory and boost the stability of time communication, they've settled on a communication system with a different design in which the main control and communication module were split.

2. In the end, they settled on the DS3231 as their RTC after considering other options. By using an external crystal oscillator, Beijing time can be pre-programmed into the system. The module then functions as an independent clock, enabling time processing even during a blackout.

3. They decided to jump into the coding, Their proposed starting procedure framework is as follows: The HC12 receives an enable signal from the main control stm32 (H7 series) when the tram reaches the predetermined location. The signal is received by the HC12, and then the L432kc receives data via the UART protocol from the stm32L432kc linked to the HC12. The L432kc then uses the time read from the RTC (DS3231) crystal oscillator module as a buffer after receiving the command. After that, the PC receives the group's name and time through USB and displays it.

*Results:* The planning of the communication system has already taken shape, and on top of this, it was ensured that the programming of the communication module was partially completed before the next group meeting

*Recorded by:* Gu Xingci

*Date:*Saturday, 11 March 2023.

*Purpose:* Improve the OpenMv pathfinding system by OpenMv programming team members, including Yuan Ye and Yang Chun.

*Procedures:*

1. After their field trips,

*Results:* 还没想好

*Recorded by:* Gu Xingci

*Date:*Sunday, 12 March 2023.

*Purpose:* Adjust servo and robot arm module by Chen Xi

*Procedures:*

1. After a heated discussion at the third week group meeting, Chen Xi carefully evaluated the design of the robotic arm and the selection of servo.

2. The original concept for the control module he was tasked with was as follows: when the rover was in front of the trash can, the master (STM32) sends a PWM signal to the robotic arm, which then rotated 180 degrees and drops the ball into the opening at the bottom of the frame. For the ball to be successfully deposited into the frame, the trolley's servo and robotic arm would be elevated above the frame via a platform.

3. For three reasons, he settled on this basic structure. One, it was easy to build (requiring only a single servo), and two, it was lightweight and takes up little room. Inherent in its bridge-type construction, the PLC material was surprisingly lightweight. Using this layout, you could save some space. Three was Personalization. We was able to adjust the drive rod's length, thickness, and interface type thanks to the 3D model. Also, you coulf alter the appearance of several objects, including the tennis ball used in the mission.

*Results:* He had a rough plan for his robotic arm's control system and hoped to have some of programming part and some of the parts 3D-modeled and printed by the time of the next group meeting next week.

*Recorded by:* Gu Xingci

*Date:*Sunday, 12 March 2023.

*Purpose:* Write initial report based on the progress they reported by me.

*Procedures:* 还没想好

*Results:* 还没想好

*Recorded by:* myself

**Fourth week group meeting**

*Date:*Tuesday, 14 March 2023, 14:00 PM-16: 05 PM

*Purpose:* Second week’s progress reports and system integration

*Procedures:*

*Results:*

*Conclusion and suggestions for future experiments:*

*Recorded by:* Gu Xingci

**Fourth week day-to-day progress：**

*Date:*Friday, 17 March 2023,

*Purpose:* Adjust the communication content of each module by communication team members, including Li Chenghao and Liu Cehan.

*Procedures:*.还没想好

*Results:* 还没想好

*Date:*Saturday, 18 March 2023,

*Purpose:* Adjust the communication content of each module by communication team members, including Li Chenghao and Liu Cehan.

*Procedures:*.还没想好

*Results:* 还没想好

*Date:*Sunday, 19 March 2023,

*Purpose:* Adjust the communication content of each module by communication team members, including Li Chenghao and Liu Cehan.

*Procedures:*.还没想好

*Results:* 还没想好

**Fifth week group meeting**

*Date:*Wednesday, 23 March 2023, 14:00 PM-16: 05 PM

*Purpose:* First week’s progress reports and system integration

*Procedures:*

*Results:*

*Conclusion and suggestions for future experiments:*

*Recorded by:* GuXingci