Project 1:

Team Organization and Task Allocation Proposal & Timeline with Milestones and Fallback Plan

Due Friday, January 30, 2004

Group 8:

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Team Organization and Task Allocation Proposal

Team Organization

Democratic Organization

We have decided that our team should be organized democratically with members having equal say, as opposed to designating a leader. Although having a leader may be more efficient, we feel that democracy will be more effective. For example, we have a shared sense that when a conflict arises that cannot be solved otherwise, a two to one vote is the most fair way to resolve the difference. Having a leader decide may create more feelings of resentment than having democracy rule. A further benefit to democracy is that our team will have a great chance of discussing issues that may be important to individual members, whether technical or personal. A leader may be focused on his perspective, and may not pay enough attention to the other member's points of view, creating a liability.

Task Division

We will divide the major tasks for the robot (not including final report, presentation, etc) into three groups: physical structure, robot code, and sensors. Each group member will be responsible for two major tasks. This allows each member to get a greater understanding of the whole project, rather than just working in one area. It is crucial that each member learn as much about the whole process as possible. Although all aspects are equally important in the field of robotics, some may be more important for the tests in this class. Thus, it would not be fair for one person to spend all their time learning lego construction, for example, when the members, at this time, do not think that will be on the tests for this class. However it must be done since projects are 60% of the grade in this class. Thus, having two areas of specialization means that each person is more likely to learn material in the projects that will be on the tests. Moreover, it also encourages teamwork and cohesiveness. Members will be able to work closely together, exchanging ideas that may come from our diverse backgrounds and experience. At the same time, it allows members to focus their efforts on only two of the three areas, making less work for each individual member and allowing them to achieve a deeper understanding of their areas. This is unfortunately necessary due to the work load of this project and time constraints of individual members.

While we have divided the responsibility for accomplishing certain tasks upon the members, it should be noted that all three members have committed from 10:30 to 1:15 every Monday, Wednesday, and Friday to work on the project together. The members are fortunate to have this time slot available where they are all on campus together and do not have other obligations.

Conflict Resolution

Since there are three members on the team, there will not be a need for breaking ties and decisions can be made, if neccesary, democratically. At the same time, we have decided to make an effort to look for win-win solutions whenever conflicts arise. Often

times, when a little thought is applied to the situation, solutions can be found that work best for both parties involved. However, if this is not possible, we will take turns accepting solutions from whenever necessary. In other words, if two people want to do something one way, and the third does not, and there is no way to make a win-win solution, then we may go with majority rule that time. However, in the future we will remember that case and will be more accomodating. In this way, one person will not be left on the outside of the decisions consistently.

Task List

Team Organization and Task Allocation Proposal Document (already accomplished)

Reasons for task

To organize and coordinate team members' efforts. To start flow of communication between team members.

Who will carry out this task?

Andy, Nouman, and David equally participated in the brainstorming of the contents and in later questions that arose during the writing. David wrote the document. It is the longer of the two documents and he feels confident in writing. This is balanced by our principle of taking turns. On later documents, other members will be responsible for writing. Also, Nouman contributed written ideas to the document and will help with proofreading.

Comments

This involved brainstorming for forty-five minutes on what tasks need to be accomplished and how are group will be organized. It should be noted that this process was helpful for the team. At first, the members decided to do every task together. After taking a break and digesting the plan, one of the members acknowledged that he does not learn well when everyone in the group is trying to learn at the same time. Upon mentioning it to the group, other members agreed and added that we might not have time to do everything together anyway. Therefore, we decided to break the tasks up and handle them individually and in groups of two, coming together three times a week to discuss progress and setbacks.

Timeline with Milestones and Fallback Plan (already accomplished)

Reasons for task

To help organize efforts by setting deadlines for each task and creating a plan in case of unforeseen events. Will help with morale to see tasks being accomplished.

Who will carry out this task?

All member participated equally in another brainstorming session to match tasks with deadlines. Andy wrote the document since he was familiar with a Microsoft software package for planning and projects. This is balanced since David and Nouman both helped with written outlines of the brainstorming sessions.

Familiarize ourselves with the sensors and handyboard

Reasons for task

This is a basic step in building the robot. Also, we need to learn the process for charging the robot, and downloading the firmware on the robot.

Who will carry out this task?

All group members. We all need this level of knowledge.

Learn Interactive C

Reasons for task

This is a basic step for understanding any code.

Who will carry out this task?

All group members. We all need this level of knowledge.

Build lego robot (One of three major tasks)

Reasons and Explanation

Our robot needs a physical structure. This is necessary by almost any definition of robot. Ours will be a mobile robot capable of turning four directions (90° right, 90° left, 0° forward, and 180° reverse). The design needs to allow the turning process to complete within one foot since that is the minimum distance between color coded squares. One aspect of turning to take into consideration is that currently we do not see how to stop our robots on demand. Therefore, a gradual turn may be necessary that is more than 90° to correct for both the response time of the robot and time it takes the robot to turn.

Who will carry out this task?

All members built the prototype by following the guidelines in Martin's book. This will help each member feel confident about the machine and attain a basic knowledge. Nouman and David are responsible for making modifications to the robot to help achieve its goals, or redesigning it from scratch if necessary.

Sensors (One of three major tasks)

Reasons and Explanation

This task is critical for the robot to navigate the colored tiles. One subtask will be to make the CMU Cam identify the colored papers correctly. Another will be optimal placement of sensors on the robot and coding the sensors. Furthermore, this may involve learning the IR sensor in order to identify the black tape.

Who will carry out this task?

Nouman and Andy will be responsible for identifying and learning any sensors necessary for the success of this project. Of course, coordination with David will be necessary and expected.

Program the Robot (One of three major tasks)

Reasons and Explanation

The robots we will construct will be based on software. Interactive C will be used to make the robot function. Once the robot has been assembled, the code for the motors, based on the CMU Cam feedback, needs to be written.

Who will carry out this task?

Andy and David.

Adjust car to make it turn right, left, reverse, and forward

Reasons and Explanation

This process may involve geometry. This will be another process of trial and error, where different values for the left and right motor will be tried until the values that turn the car to the right spot within one foot are found. Even going straight forward may be difficult if the car is not perfectly balanced.

Who will carry out this task?

Since this is a synthesis of all major tasks, all members will be involved.

In-Class Demonstrations

Explanation

The members need to make up several possible courses and test the robot for each of the courses. This should be done in the Robotics Lab or classroom if possible (depending on which of the locations is chosen for the actual demonstration). In this way, the variables of the surface and the lighting will be accounted for. When the robot succeeds in about three different courses in a row, with any other problems accounted for, we will assume it will work on the test day. Also, whomever has the robot right before the demonstration day will need to be sure the robot is fully charged.

Reason

To ensure as few unknowns as possible interfere with the demonstration.

Who will carry out this task?

All members will carry out this task together during the recurring time slots they have free together. It will be advantageous to have them all there for efficiency and for their individual knowledge.

Final Report

There are four documents that need to be turned in for the final report: Robot Design, Robot Code, Robot Code Documentation, and Team Organization Evaluation and Plans. Descriptions of and reasons for these documents can be found in the assignment documentation.

Who will carry out these tasks?

- Nouman will write the Robot Design document since he has not written a document yet and since he is responsible for robot design. As in all of these documents, all members will help with proofreading.
- Andy will be responsible for checking the robot code and making sure it is well structured, well commented, and has no memory leaks for the Robot Code document.
- David will write the Robot Code Documentation.
- Finally, the Team Organization Evaluation and Plans needs to be written. For this task, the members will have a brainstorming session to discuss and write down ideas for the evaluation and plans for the future. Since Nouman did not have primary responsibility for the two documents that were due on January 30, he will be the member who has two documents of the four due for the final report. Nouman will be responsible for editing the brainstorming session into a final document. Also, Andy will help out significantly in editing since he only has to check the robot code for the final report (He does not have to write a paper from scratch).

In-Class Presentations

We will divide the two main topics, “success of our team organization and task divisions” and “robot and code” into three subtopics each. Every member will discuss a subtopic for an equal amount of time. This will insure that no group member has to bear the load of the entire presentation for a project. Furthermore, since each member will specialize in a major task area, it will be easier and more effective if that member discusses that topic for the presentation.