CSCI 1106
Lecture 18

Project Planning
Announcements

• Quiz #5 is on Friday, November 15, in class
  – Including this lecture

• Today’s Topics
  – The Project: Robot Olympics
  – Program Planning
  – Strategy
  – Tactics
Robot Olympics

• Consists of 3 events:
  – Marathon
  – Hurdles
  – Curling

• Your Group’s Tasks:
  – Write a program for each event
  – Compete in the Robot Olympics
  – Write a report on your project
General Rules

• One program per event
  – Programs cannot be changed once competition begins

• No human interference
  – You may not touch a robot while it is competing
  – Robots may be disqualified if interference occurs

• Robot’s performance affects your grades
  – See project specifications for rubric
Marathon

- As quickly as possible
  - Race down the corridor
  - Cross the line
  - Race back
  - Cross the Finish/Start line

- Robot has one 3-minute attempt
Hurdles

- Move from START to FINISH as quickly as possible.
- Robot cannot dislodge objects, cross the center line, or leave arena.
- Robot has three 2-minute attempts.
Curling

• Qualifier #1
  – Robot must stop moving after 1 minute
  – Robot may not leave the arena

• Qualifier #2
  – Robot must end up within the outer ring within 60 seconds
  – Robot must be able to start from either START position

• Competition
  – Head-to-head double elimination
  – Robot closest to the center of the ring after 60 seconds wins
  – Starting position determined by coin toss
The Project Report

General Information

• Report is aimed at peers, TAs, & instructor
• 8 pages, 11pt (see template)
• The report must
  – Provide sufficient background
  – Describe the program design, strategy, and tactics
  – **Justify your design decisions**
  – Describe how successful the programs were
  – State overall conclusions
• Rubric in project specification

Recommended Structure

• Title and author information
• Abstract
• Introduction
• Background
• Main Body
  – Marathon
  – Hurdles
  – Curling
• Results
• Conclusions and Future Work
• References
Where Do We Start???

• Situation:
  – 5 Labs (+ overtime if need be)
  – 3 Programs
  – 1 Project Report
  – 3 to 4 group members
  – 1 Robot

• Step 1: Identify the Tasks
  – Develop three programs
  – Write a project report
Steps for Developing a Program

1. Develop program *strategy*
2. Identify *tactics* to implement the strategy
3. Model tactics with state transition diagrams
4. Implement program based on STDs
5. Test your program
6. Refine strategy and tactics as necessary
7. Repeat
**Strategy**

- How are we going to solve the problem?
  - Typically there is more than one way
  - Can be described in a couple sentences

- Example: Getting to class on time
  - Avoid the rush hour
  - Don’t drive
  - Live in residence

- Example: Preparing for exams
  - Study in advance
  - Cram the night before
Example: The Line Race

Strategies
• Go as quickly as possible, and pay the price of losing the line
• Go slow enough and never lose the line

Start
Finish
Strategy (cont.)

• Should be able to describe the strategy in a couple of sentences
• Use one strategy per problem
• A strategy is implemented with tactics
  – Tasks
  – Ideas
  – Concepts
• Each part of the strategy must be implemented with one or more tactics
Tactics

• Tactics are how you implement the strategy
• Example: Cramming
  – Consume lots of sugar and caffeine
  – Play loud music
  – Tie yourself to your desk
• Example: Following the line at full speed
  – Implement a good recovery mechanism
  – Make sure your tires have good traction
• Tactics may be composed of multiple simpler tactics
• How do you put it all together?
Program Planning

• For each event formulate a strategy
  – Convince yourself that you can implement it
  – Identify the tactics you will need
• For each tactic
  – Design a state transition diagram
  – Design corresponding part of the program
• Put the parts together
• How much time will this take?
Project Management

• Determine amount of time to spend on each task:
  – Marathon
  – Hurdles
  – Curling
  – Project Report

• Note: former three can be done sequentially, the latter in parallel

• Divide up time among tasks: (example)
  – Marathon (1 lab period)
  – Hurdles (2 lab periods)
  – Curling (2 lab periods)
  – Project report (homework)

• Notes:
  – Be prepared to adjust your time estimates as the project evolves
  – Group communication and management is very important!