Proposing a Design Strategy

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Agenda

Techniques for **starting** the proposal
Using the proposal’s **structure** to document and manage your design process
How the parts of the proposal **inform** your reader
The Grand Challenge marks a move from instructor-led tasks to team work on complex, interdependent systems.
Team members are now challenged to think as designers and innovators.
Design is a process fraught with uncertainties
Devise a strategy for solving problems as they emerge and for providing specific detail about systems under development.
Use the proposal as a tool for documenting the design strategy, allocating tasks to team members, and holding the team accountable for producing deliverables.
Readers want **specific** reasons to **trust** your design strategy
As stakes become higher

...for instance, when money is involved...

the need for clear plans becomes even more urgent
Writing the proposal helps **articulate** the system requirements and your team's assumptions.

What are the **criteria** for a successful robot?

What are the design **constraints**?
To get **started**, try working on your paper from the **inside** out...
To form the core of your proposal, list and explain the design details:

Hardware plan and rationale
Control architecture and rationale
Necessary algorithms and rationale
Software plan and rationale
Integrate words and pictures

Design graphics to inform the reader
Label graphics clearly and correctly
Refer to the graphic and discuss/interpret it in text
Figure 3: Proposed finite state machine diagram for robot.
Map out timelines and schedules for deliverables

Fabrication
Testing
Redesign
Final implementation
The proposal’s **structure** gives the team a way to organize a **wealth** of detail.
Introduction gives overview of strategy and explains how requirements will be met

Context of challenge
Motivation
High level overview of the proposed design
The design description in the **body** of your proposal is organized into **systems** and **subsystems**

Use informative subheadings for details
Organize information under subheadings
Read the sections your teammates write
Risks and assumptions

Are there particular risks to your design strategy?

What assumptions are reasonable, given your design constraints?
The conclusion summarizes strategy, tradeoffs, and open issues

How does the design fulfill requirements?
What are the principal tradeoffs?
How are the tradeoffs justified?
What issues need to be resolved?
Documenting a design strategy makes it **concrete**
Share and discuss inspirations, points of view, and assumptions
Compare the **sections** of the report for redundant information, gaps, or contradictions
Help each other craft transitions and connections between ideas
The **process** of organizing the proposal and making the parts work together identifies gaps in the **team’s knowledge**.
Listing **open issues** gives the team a to-do list and milestones for the next stage of development.
Design the document for legibility and easy reference
User interface items

Include a **table of contents**, properly formatted

Make sure **headings** convey **useful** information

**Number** the **pages** of the proposal

Include team members' names on the **title page**
Create a list of **open issues** and keep it updated

Areas of uncertainty
Questions for further research
Incompatibilities
Innovation forces teams to explore unknown and uncertain territory
Documenting the design strategy helps to structure the work and articulate goals.
A well-crafted design proposal is useful for managers and investors – and for the development team
Proposals establish strategy, give a team its common language, and are updated throughout the cycle of development.
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