ECE 420
Lecture 8
October 21 2019

Suggestions for a Successful Final Project

Key Components of the Final Project Proposal

(not necessarily in this order)

- Introductions

- Background

  - Results from Assigned Lab

- Deliverable

- Algorithmic Summary

- Milestones

- Testing and Validation Plan

Introductions

Who Are You?

- Just like any assignment, it is a good idea to include your name

- And your NetID also

- Adding your group number (from Compass) helps our administrative efforts

- You could even put some of that information in the file name of your submission!

- This applies for proposals, presentations, and reports

Introductions

- Have a name for your project

    - This can be descriptive or eccentric (or both)

    - Do not underestimate projects with memorable names!

- Provide some background on the problem you are trying to solve and mention the algorithms you will be leveraging to solve them

- Give a very brief summary of your end project deliverable and what makes it stand out from other projects

    - This is the 'elevator pitch' for your project – what are you doing and what value does it deliver?

Background

Previous Work (by others)

- Cite the work you are using as a basis for your project

- Summarize the approach taken in the algorithms you are using or comparing/contrasting to

  - This can be fairly high level if desired, if the algorithm you will be implementing is described in more detail elsewhere

- Make note of how you are planning to use, improve, or modify the algorithm for your application

  - Especially for the Final Project, your aim should not just be "we will implement this paper on the tablet"

Assigned Lab Results

- What did you do?
    - Describe the application of the algorithm
- How did you evaluate your work?
    - What did you use as input data?
    - How was it generated?
    - How did you measure success / performance?
- Describe difficulties encountered
- Show results of your evaluation
    - An example input/output (if possible)
    - Performance metrics collected (if possible)
- The better you can quantify your success, the better!

The Deliverable

Final Deliverable

- Wikipedia: A deliverable is a tangible or intangible good or service produced as a result of a project that is intended to be delivered to a customer (either internal or external).

- The Final Project is the work **towards** that deliverable

- The application that is developed **is** the deliverable

Final Deliverable

- You need to be clear about what your deliverable is

    - "Implementing an algorithm on Android" is not a deliverable in this case

- Definition of a deliverable is the <u>what</u> not the <u>how</u> of your application

    - Define what functionality/value the application will be providing

    - Define the inputs and the outputs of the application

    - Define how the user will interact with your application (see also: inputs and outputs)

MVP and Stretch Goals

- A project involves a lot of unforeseen obstacles and difficulties
    - Nobody is a perfect prognosticator
- The deliverable can be divided into an MVP and stretch goals
- MVP – Minimum Viable Product
    - A deliverable that 'works', provides value, and can be distributed to customers
    - Committed 'minimum' deliverable by your team
- Stretch Goals
    - The 'time permitting' features
    - Nice to Have vs. Need to Have
- Objective is to encourage something that works with less functionality than a totally non-functional system

Deliverable Mock-up

- Just as flow diagrams can convey algorithmic operation, a mock-up can convey your team's vision for the deliverable

- Need not be a fixed commitment, but provides an idea of how the application will function and helps establish expectations

- Very coarse, very approximate

- Taking a picture of a hand drawn mock-up is fine!
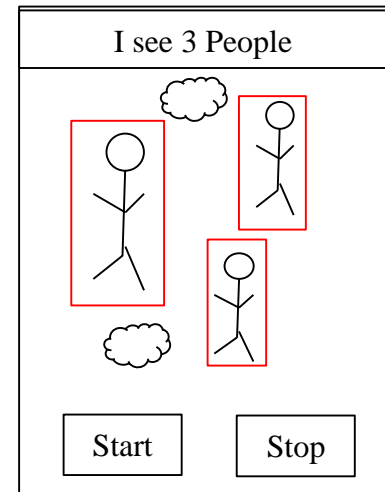
Algorithm Summary

Algorithm Summary

- Flow graphs can both help you manage your system and also convey its operation

- Nested flow graphs are also fine if system complexity warrants it

- Serves as a good reference for code implementation
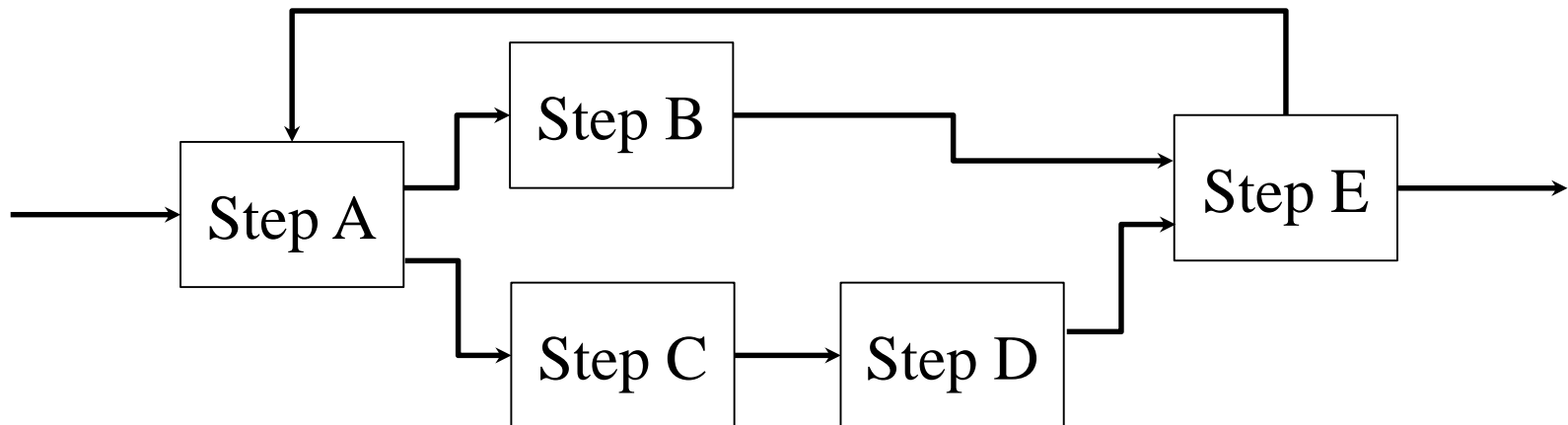
Algorithm Summary

- Selecting the right level of detail is probably the most challenging decision

- Equations can provide good specificity of operations to be carried out but don't always give sufficient context

- Written descriptions of the steps can give a good notion of what the algorithm is doing but can leave some ambiguity

- The "best" is likely a mix of the two

- Key idea is being able to convey what is being done in the work

  - Would somebody else be able to reimplement or extend your work?

Milestones

Milestones

- Milestone - event marking a significant stage in development

- Your proposal will have to include two intermediate milestones

  - The Final Deliverable could be considered the third milestone

- Helps in determining project feasibility

  - Breaking project down into smaller steps

- Assists in assessing project progress

Milestones

- Your team is assessed and graded based on achieving these milestones

- Milestone grading cadence:

Nov 4	Project Starts
Nov 11	M1 Demo
Nov 18	M2 Demo
Dec 2	FP Demo

- Work on a given week does not have to correspond 1:1 with milestones

Writing Good Milestones

- Milestone should contain two aspects – what will be accomplished (goal) and how that goal will be demonstrated

- A good goal is definitive

  - Be descriptive of what you will accomplish, but don't include excruciating detail

  - DO NOT include implementation details

- A good milestone is objectively demonstrable

  - Show some functionality, and/or example(s), and/or collected metrics

  - "Code Waving" only as a last resort

- Validating the milestone is achieved should be a simple process

  - The more vague the milestone, the more open to interpretation for grading

Milestone Revision

- Depending on challenges encountered, milestones may not be achieved on the desired schedule

- Falling behind on one milestone can create a ripple effect (the 'bump out')

- Team options:
  - Try to catch up to the proposed schedule
  - Revise the proposed schedule

- If you want to revised your proposal, either with regard to milestones or the final deliverable, you should email your TA and the instructor with your proposed changes as early as possible

- Be realistic about your timeline
  - Better to revise the project back than to continue to fail to meet milestones and deliverables

Testing and Validation

Testing and Validation

- Just implementing your application is not sufficient, it should be a working application

- How will you demonstrate it works? Both internally as a team and externally to instructor/TA/other students?

- Generally speaking, we can consider validation by providing inputs and checking for expected outputs

  - What inputs will you be using? Are those pre-existing or do they need to be generated?

  - What are the outputs? Is it objective or subjective? Can you collect metrics?

Testing Results

- Ideally we would like an application that works perfectly all of the time

- Transitioning to the Android platform introduces a host of 'real world' conditions that can make algorithmic development tricky

- For a project of this time frame, likely compromises will be made to get something functional

- Tiered tests are a method for evaluating your app performance

  - Start with 'easy' test cases, work your way up to more complex

  - This can establish that the algorithm is not fundamentally broken, but has limitations

  - Determining those limitation is valuable knowledge!

Key Components of the Proposal Presentation

(not necessarily in this order)

- Introductions

- Background

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- Testing and Validation Plan

Presentations

- Expectation is slides or other visual medium

- Every team member should do some portion of the presentation delivery

- Total time of 20 minutes

  - We will be reading the proposal/report as well, so fine detail should be avoided

- Allow a little time for Q&A from students / TAs / instructor

Key Components of the Final Project Report

(not necessarily in this order)

- Introductions

- Background

- Deliverable

- Algorithmic Summary

- Testing and Validation Results

- Code Summary

- Suggestions for Future Extensions / Modifications

Main Differences from Final Project Proposal

- Deliverable section

  - Updated with project actually delivered

  - Note changes to MVP and state of stretch goals
    (can note what was encountered that necessitated changes)

  - Replace mock ups with actual screenshot(s) of your app in action
    (could alternatively be in results section)

- Updated Algorithm as necessary

- Testing and Validation – results instead of plan

Main Differences from Final Project Proposal

- Code Summary

  - An 'inventory' of your code (submitted separately)

  - What files/functions/classes contain which functionality?

    - Relate back to algorithm

- Extension/Modification section

  - Given more time, what else would you like to do?

- Can include challenges/difficulties faced where appropriate

- How many pages?

Key Components of the Final Project Presentation
(not necessarily in this order)

- Introductions

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- Algorithmic Summary

- Testing and Validation Results

- Live Demo
  (Video if Live Demo prohibitive)

Final Project Process

- 10/27 - Final Project Proposals Due

- Week of 10/28 - Final Project Proposal Presentations

  - Feedback will be given on proposal

- 11/3 - Revised Final Project Proposal Due, Assigned Project Lab code Due

- Week of 11/11 - Milestone 1 Demo in Lab

- Week of 11/18 - Milestone 2 Demo in Lab

- Week of 12/2 - Final Project Presentation in Lab

- 12/13 - Final Project Report Due (optional video for extra credit)

Grading

- Assigned Lab
  - Project results (part of Final Project Proposal): 5 pts
  - Demo (part of Final Project Proposal Presentation): 4 pts
  - Code submission: 1 pt
- Final Project Proposal
  - Initial Final Project Proposal Submission: 1 pt
  - Presentation: 5 pts
  - Revised Project Proposal: 4 pts (revisions to Assigned Lab results will not be considered)
- Final Project
  - Milestones: 5 pts each
  - Report: 10 pts
  - Demo: 10 pts

Summary

- The Final Project is a large undertaking

- We want to understand your work so your efforts can be recognized

- Provide the level of detail in your reports and presentations to facilitate transferring that knowledge