FYP: Serious Games for CS Education

1 Timeline & Overview

1. Proposal (25/10, wk5): What, Why, How (∼Dissertation intro)
2. Lit. Review (25/11, wk8): "I know what I'm doing"
3. Progress Demo (20/2, wk21): "I made this"
4. Dissertation (5/5, wk31): "It works because I did it right"

2 Milestones

- Start with Proposal and Lit. Review—they are due quite early
- Proposal (1):
  - Big overview
  - Will be similar to the dissertation intro
  - Should be in future tense
- Lit. Review (2):
  - Show that you know what you're talking about, and what's out there
  - Write up what you've looked at
  - Very early!
- Estimated timeline:
  - Have something complete before progress demo
  - Have time for user testing: get users to try it out, see if they have learnt anything
- Progress Demo (3):
  - Working game with the basic functionality
  - Have something ready that users can test
  - 10%/20% (?) of the final mark
- Dissertation (4): 60 pages, ∼30,000 words

3 Proposal: Why

- Games are good for education because:
  - Accessibility
  - Engagement
  - Instant feedback
- Read and go through literature with these in mind
- Find support and evidence of these (answer the 'why' part)
- See what else can be built upon

4 Proposal: How

- Have a rudimentary game idea in the proposal
- Game design basic outline:
  1. Learning objective: What do you want the player to learn?
  2. Player goals
  3. Player moves
  4. Interface
  5. Feedback & rewards
  6. Level design
  7. Platform: Keep it accessible (e.g. a web app is one of the best options)

5 Proposal: What (Foundations of Computation)

- Venn Diagrams
  - Already graphical
  - Think about player interaction
- Sets and Relations
  - Already graphical
- Automata
  - Project already exists—was very good
  - Would need to improve on this enough to justify a project
  - Maybe add push-down automata? (undecidable)
- Turing Machines

  - Undecidable
  - Hard to make accessible (how to do it?)
  - Have to find many simple challenges
- Lambda Calculus
  - Interactive tutorial
  - Hard to find a game in there

6 Proposal: What (History of Proof Theory)

- Aristotle's Syllogisms
  - Can be linked with Venn diagrams
- First-order logic
  - Predicate logic: propositional logic with quantifiers by Gottlob Frege
  - Mathematical notation:
    * $\wedge, \vee, \neg, \rightarrow, A(x)$ "x is A, A holds for all/some x"
    * All A are B, $\forall x.A(x) \rightarrow B(x)$
    * Some A are not B, $\exists x.A(x) \wedge \neg B(x)$
- Natural Deduction
  - Decide on a learning objective
  - Challenge is in making a good interface
- Open Deduction
  - Make derivations from set of rules
  - Assumption + conclusion
- Natural Deduction & Open Deduction
  - Been tried before (last year)
  - Implementation not so good