Project

Hardware project

- 3 Week to complete project
  - Final week for presentations
- Build whatever you want
  - Using FPGAs + Verilog (not software!)
  - We have additional hardware available
  - Look at existing projects on Quercus projects page
  - Can build off existing work (with appropriate credit given, and clearly explain what you add!)
- Teams of 2-4

Availabe Hardware

- DE2 Boards (obviously)
- INPUTS
  - Buttons
  - Keyboards
  - Joysticks
  - Sensors (light, touch, vibration, rotation, temperature, Infrared, heat, sound, and lots more)
- OUTPUTS
  - VGA monitors (you'll use these in lab 6)
  - LEDs
  - Buzzers
  - Motors

Pairing

- Notify your TA of your chosen practical by the end of this week (Friday March 1) as to the group composition and PRA you will go to.
- Choose groups of 2-4.
  - Bigger group are expected to have more ambitious projects.
- You can stay with your current lab partner.
- You all need to work together every week in the same practical (make sure you can all attend!)
- Changes to group and PRA will not be granted.

Reports

- Project Plan
  - Initial plan due March 7
    - (Don't worry, we won't be holding you to this plan… much)
  - High level outline of what you plan to do
  - Submit via Quercus
- Weekly Updates
  - Each week you will update your file with what happened that week and how you plan to proceed. Submit to Quercus (due every weekend)

Final presentation + report

- Present your final project to your TA during your last practical (last week)
- This means you won't have time to work during that week
- You will record a presentation and create a short video.
- Final report will include with links to videos, code location, etc. Due last week, Friday, April 5.
- With your permission, we will put select projects online for future students.

Marking

- Project is worth 20% of your final grade
- You will be marked on effort and achievement:
- Effort:
  - Documentation, report file, proposal, comments
  - Video / final presentation
  - Working hard during lab time, and planning
- Achievement:
  - Ambition of project
  - Execution of final product
- Roughly speaking, 50% effort, 50% achievement.

Tips

- Design will be KEY
  - Good hierarchy
  - Modularity
  - Testing each component
  - See what's available from sources of old projects
- Plan and use your limited lab time wisely
  - Prepare beforehand
  - Know your goals before you arrive
  - Most of your in-lab time should be debugging
  - Backup regularly or use source control

Tips

- Teamwork
  - Divide tasks
  - Check partners code (its amazing the bugs that can be found by a fresh set of eyes)
- Planning/Scale
  - Your mark will be based on course-related content
  - Hardware will be fun to play with, but don't get so bogged down you forget about core principles
  - Have back-up plans. Build iteratively
  - You don't have to use fancy hardware. There has been impressive projects with just DE2 and VGA.

Perspective

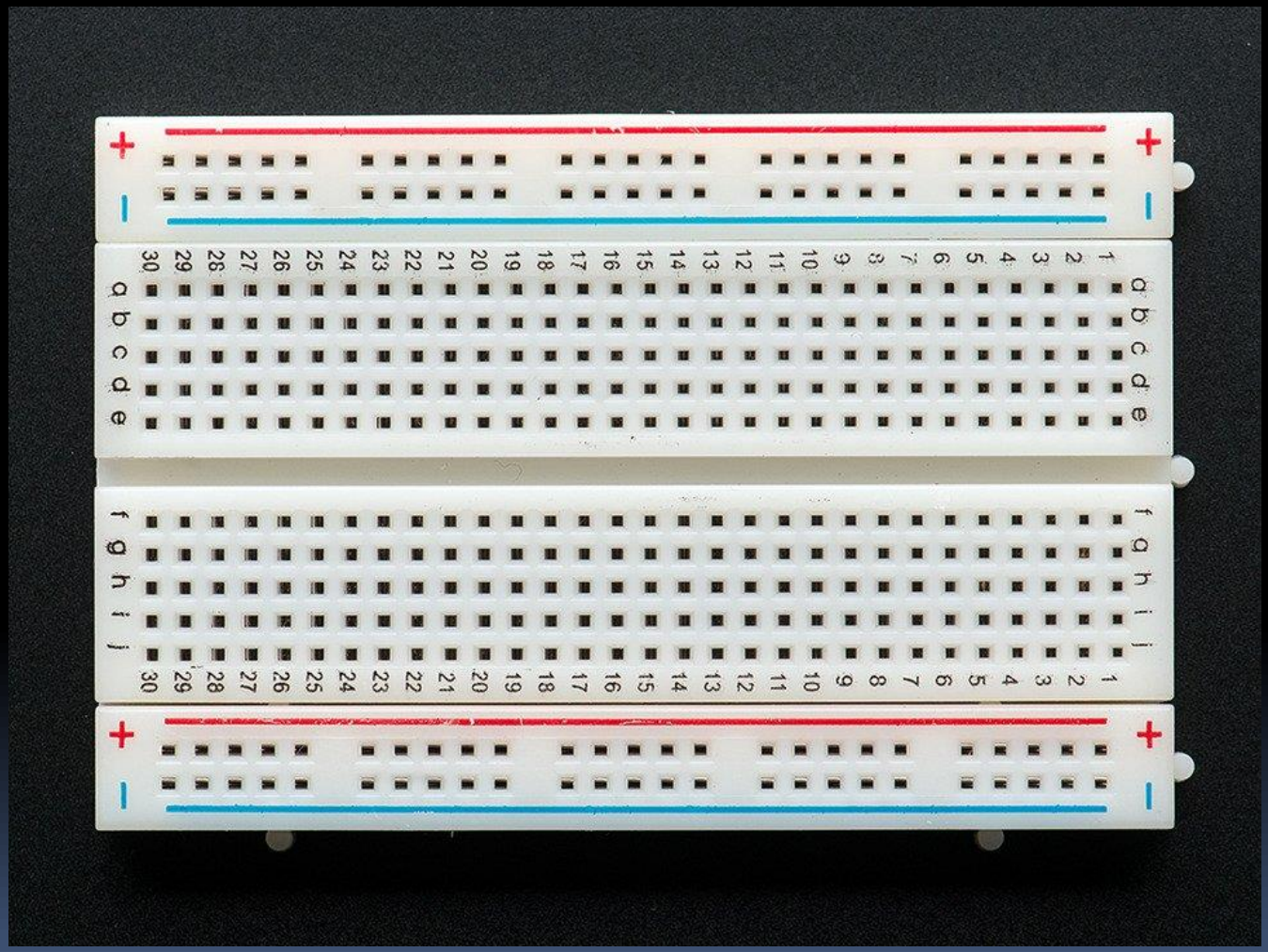
- Maintain perspective
- This project is worth 20% of your grade.
- It is a lot of work.
- Don't get so absorbed that you forget to prepare for exams or submit other assignments.
- Backup regularly or use source control

Past projects

- Some links on course website
- Searching CSC258 on YouTube will get you lots of hits
- Remember: You don't have to start from scratch, but you MUST give credit for any code you use, and clarify the novelty (what you added on top of existing work).

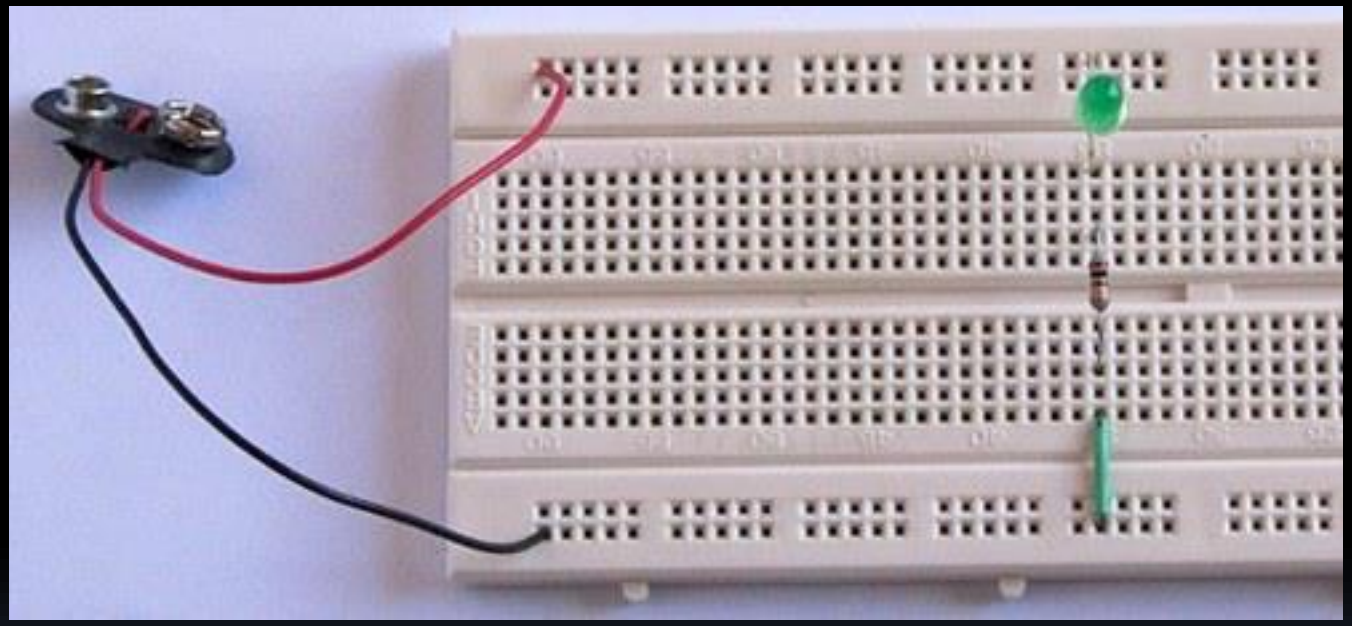
(Very) Brief Intro to Hardware

Breadboard



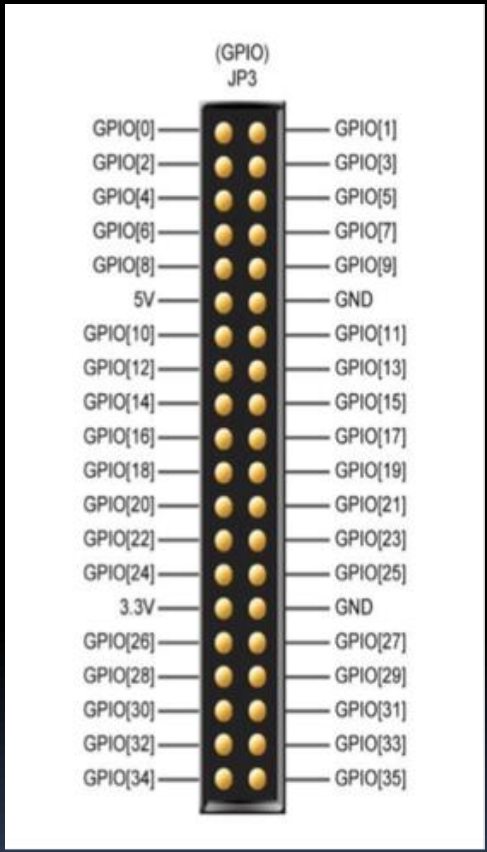
Breadboard connections

Creating a circuit



- Instead of a battery, you could hook up to the 5v and GND inputs on the FPGA
- You need a resistor (or hardware that resists)

Controlling a circuit



- Instead of a constant 1 or 0 (5v or GND), connect to a GPIO port
- (General Purpose Input Output)
- Can turn the port on/off to control the circuit (output)
- Can read from the port to see if circuit is complete (input)

Good luck