

# Quantitative Evaluation Techniques

Hello, my name is Julie Williamson and you are sitting in  
CS1F (it's week 8).

# Sli.DO

- Event ID: 6515

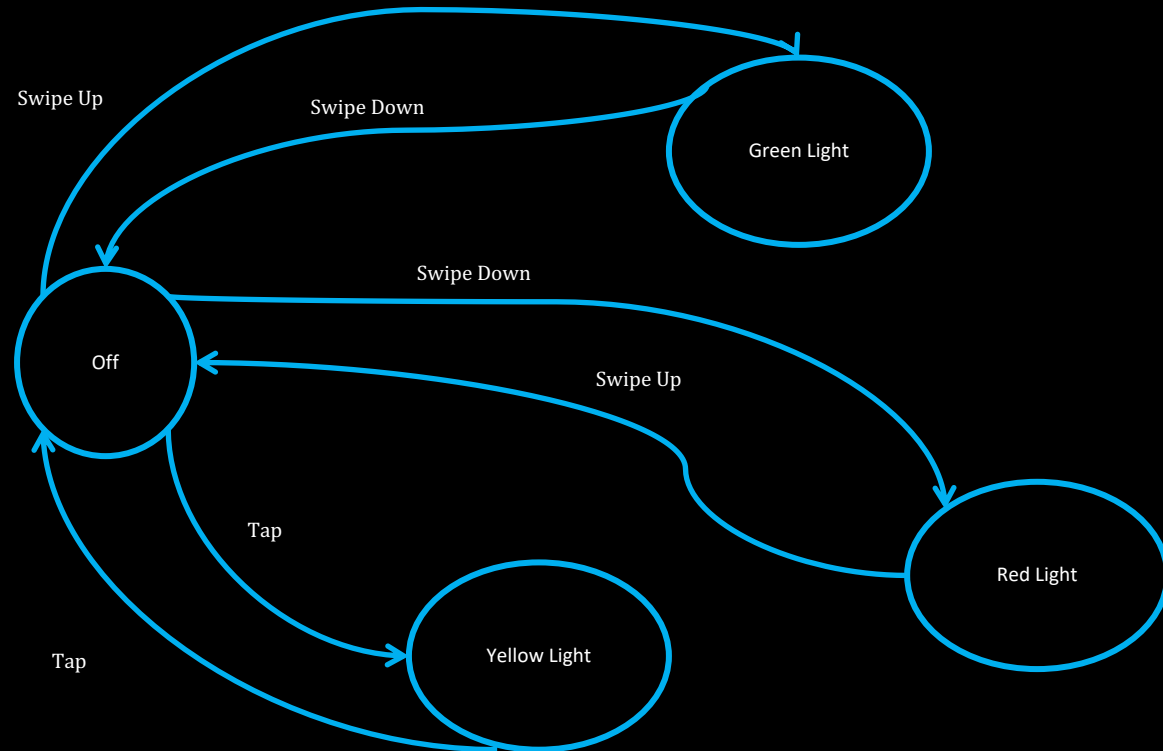
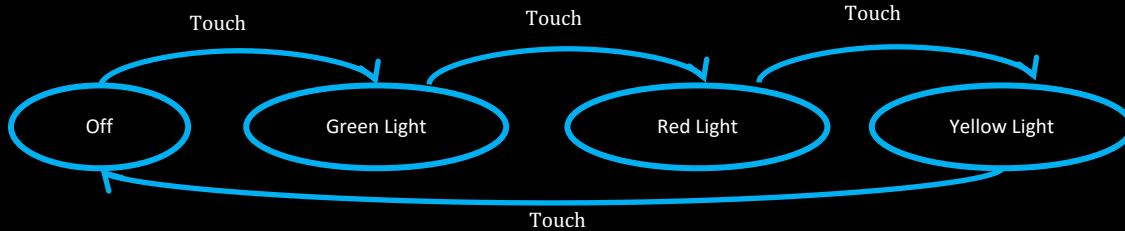
# HCI Lab

- Individual Assessment worth 8% of your mark for CS1F
- Four week cumulative lab assessment
  - Labs in week 8, 9, 10, 11

# This Week's Lab

- You are tasked to design a new input technique for a flashlight with several operating modes. The flashlight is a new design which includes a single "touch slider" interface on the barrel of the flashlight. It does not have any buttons additional inputs or buttons. There are multiple modes controlled with a touch control that go beyond a simple "on/off" switch. This presents an interaction challenge: how to control the different states of the flashlight given potentially noisy, unreliable input.

# Sketching State Machines



# Why running good evaluations is important

- A good experimental design means you can meaningfully answer questions about your system
  - Inferring causal relationships takes careful planning and analysis
- Ethical practice is a crucial part of computing science work

# Recap: Quantitative Methods

- Continuous versus Discrete Data
  - Continuous data is counted along a continuous spectrum, such as time to complete a task
  - Discrete data is counted as finite occurrences, such as number of errors

# Recap: Quantitative Methods

- Understand mean and standard deviation
- Is the data normally distributed?



# Independent and Dependent Variables

- Independent variable: What is manipulated by the experimenter
  - For example, comparing two designs, testing different output techniques
- Dependent variable: What is measured, where the experimenter expects to see a difference
  - For example, task time, completion rate, user satisfaction

# Example

We are testing the usability of a gesture controlled display. We want to know if we can improve the usability of the display using different animated prompts to teach users how to interact. For each user, we bring them into the lab and show them all of the different prompts and measure their responses.

# StrikeAPose: Revealing Mid-Air Gestures on Public Displays

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Figure 1. a,b,c) Three strategies for revealing an initial mid-air gesture on public displays: a) spatial division, b) temporal division, c) integration; d,e,f) examples of findings from our field study: d) the Teapot Gesture is fluently integrated with other gestures, e) users explore a potential gesture vocabulary, f) users often imitate other users' gestures.

## ABSTRACT

We investigate how to reveal an initial mid-air gesture on interactive public displays. This initial gesture can serve as gesture registration for advanced operations. We propose three strategies to reveal the initial gesture: spatial division, temporal division, and integration. Spatial division permanently shows the gesture on a dedicated screen area. Temporal division interrupts the application to reveal the gesture. Inte-

## INTRODUCTION

Touch-based interaction is the common modality for public displays. However, distant interaction through mid-air gestures has several advantages for public display interaction. (1) It does not require to touch public installations which may be inappropriate for hygienic reasons. (2) Users do not need to come close to the screen to interact. (3) It can help noticing interactivity of public displays because passers-by can inter-

# What we aim to learn from experiments

- What do you think this experiment is trying to achieve?

# What we aim to learn from experiments

- What do you think this experiment is trying to achieve?
  - Which prompts lead the most users to perform the correct gesture?
- The full study is available here:
  - <http://joergmueller.info/pdf/CHI13WalterStrikeapose.pdf>

# How to Run an Experiment

- A standard lab experiment has these key stages
  - Provide information to participants about the goals of the experiment and what is involved
  - Gather informed consent from participants
  - Complete a series of tasks to collect data from participants
  - Finish the experiment and provide de-briefing

# Experimental Ethics

- Participants must provide informed consent
- Experimenters must not be in a position of authority over participants
- Participants understand they can withdraw at any time
- Participants are given the contact information for experimenters

# Evaluation Scenario

We are testing the usability of a tourism application for a mobile phone. The app supports visual or audio navigation.

What type of questions might we try to solve in this scenario?



# Evaluation Scenario

We are testing the usability of a tourism application for a mobile phone. The app supports visual or audio navigation.

- Do users discover more points of interest using the audio navigation?
- Do users have a better experience using audio navigation?
- Are users less likely to make navigation errors using audio navigation?

# Evaluation Scenario

We are completing an evaluation of an online banking interface. The interface recently added support for setting up text notifications for bank balances.

What type of data would we collect to answer questions about this scenario?

# Evaluation Scenario

We are completing an evaluation of an online banking interface. The interface recently added support for setting up text notifications for bank balances.

- Number of text notification setup
- Number of failed attempts to setup notifications
- Time spent setting up notifications
- User feedback
- Mouse movement logs
- Gaze position

Let's check in with sli.do...