Designing Rhythm Game Interfaces for Touchscreen Devices

Project Progress Report
Members: Philip H. Peng
Advisor: Dr. Stephen H. Lane
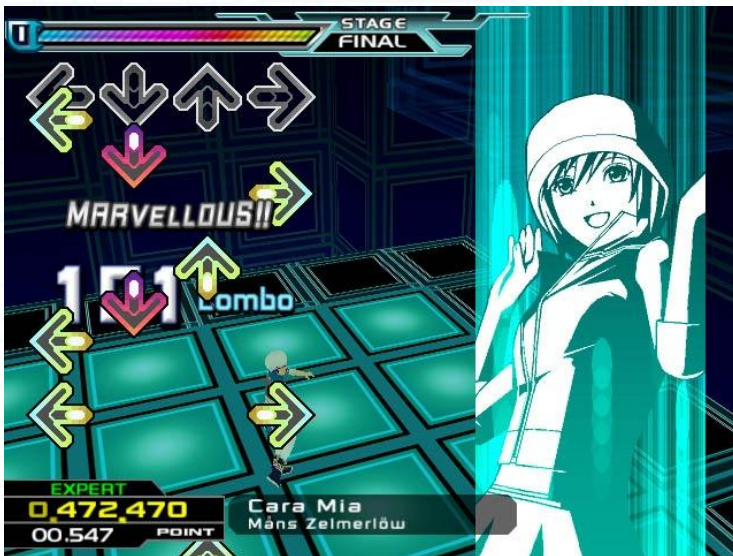CIS 400, Fall 2011, University of Pennsylvania

Presentation Overview

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Philip Peng, 2011/12/07

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Introduction

Rhythm Games: genre of music games, notes and hitboxes, mix of puzzle/action

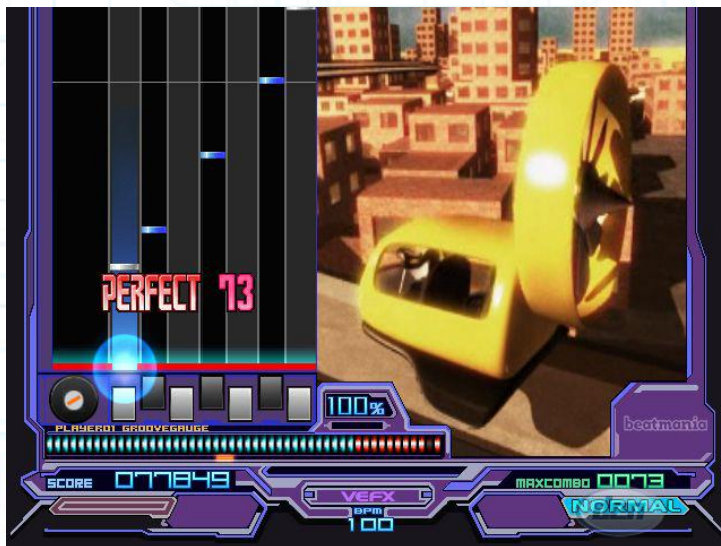**Touchscreen Devices**: devices that use touch for default input

Rhythm Game Examples

Dance Dance Revolution

Guitar Hero

Beatmania IIDX

AudioSurf

More Rhythm Game Examples

DJMax Technika

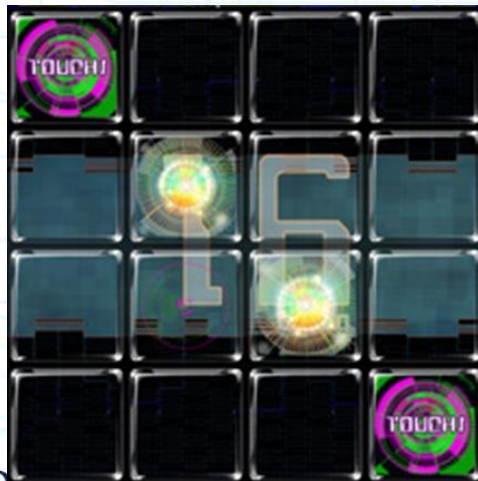## Taiko no Tatsujin

PaRappa the Rapper

THE iDOLM@STER

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Even More Examples!

Osu! Tatakae! Ouendan!

Gitaroo Man Lives!

Jubeat Plus

Hatsune Miku: Project DIVA

Question

Aren't they all the same?

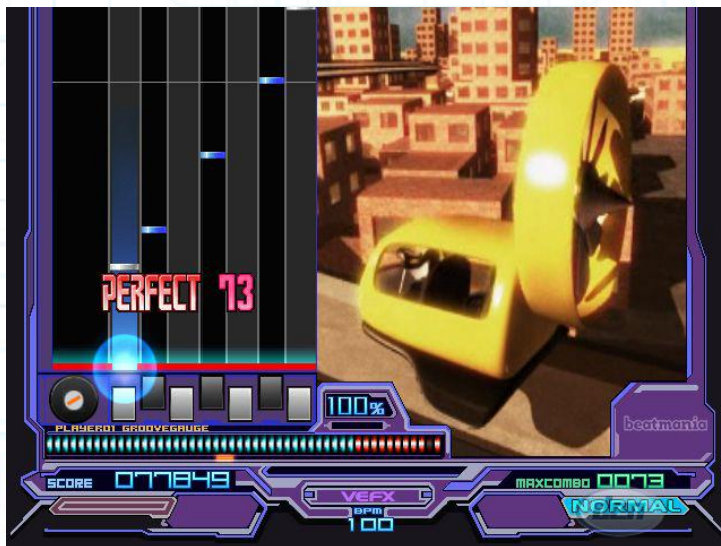Looks and usage may differ but ultimately all do the same thing

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Multi-Column Interface

Dance Dance Revolution

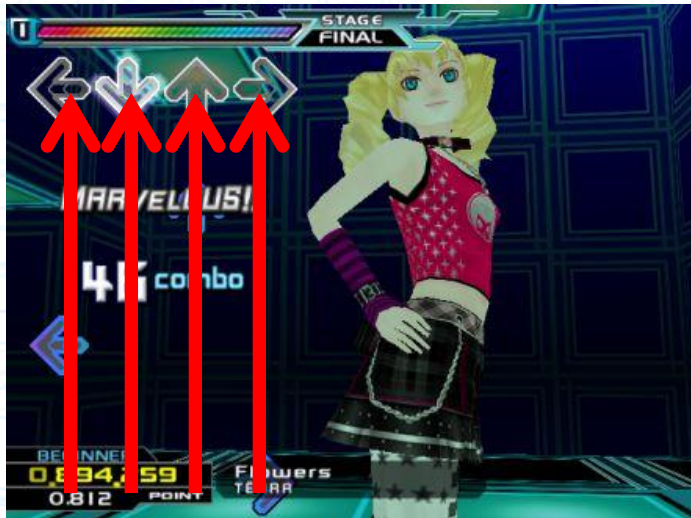
Guitar Hero

Beatmania IIDX
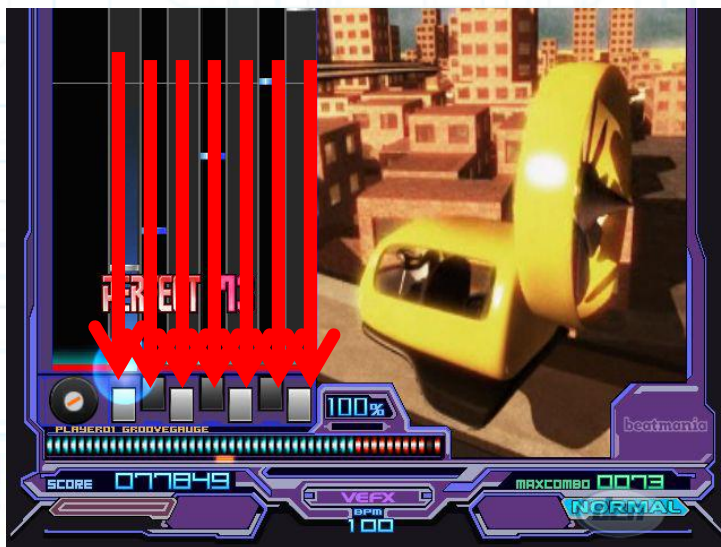

AudioSurf

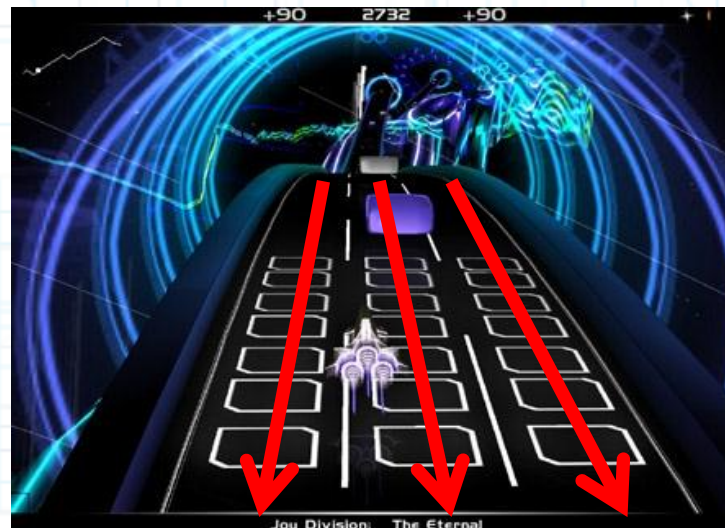# Multi-Column Interface

Dance Dance Revolution

Guitar Hero

Beatmania IIDX

AudioSurf

Moving/Point Focus Interface

DJMax Technika

Taiko no Tatsujin

PaRappa the Rapper

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Moving/Point Focus Interface

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THE iDOLM@STER

Fullscreen Covered Interface

Osu! Tatakae! Ouendan!

Gitaroo Man Lives!

Jubeat Plus

Hatsune Miku: Project DIVA

Fullscreen Covered Interface

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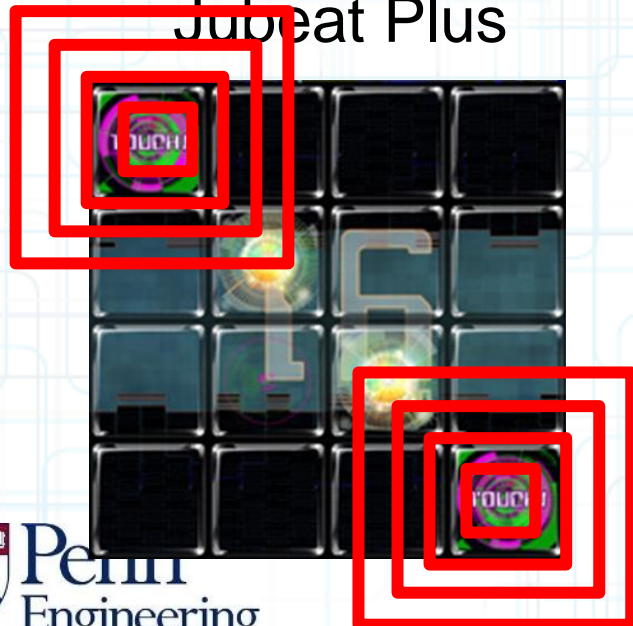
Touchscreen Devices

Why?

- New technology, becoming common
- Touch-driven input paradigm
- Games need to be redesigned
- Android tablets, iPads, Windows 8

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Project Proposal

Goal:
Design, prototype, and evaluate different rhythm games interfaces for touchscreen devices.

Approach:
Create a rhythm game prototype for Android tablets that demos various game interfaces and collects usage data to evaluate their effectiveness.

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Related Work

Wiimote + Dance Game
"Understanding Visual Interfaces for the Next Generation of Dance-Based Rhythm Video Games" – University of Central Florida, Orlando, FL
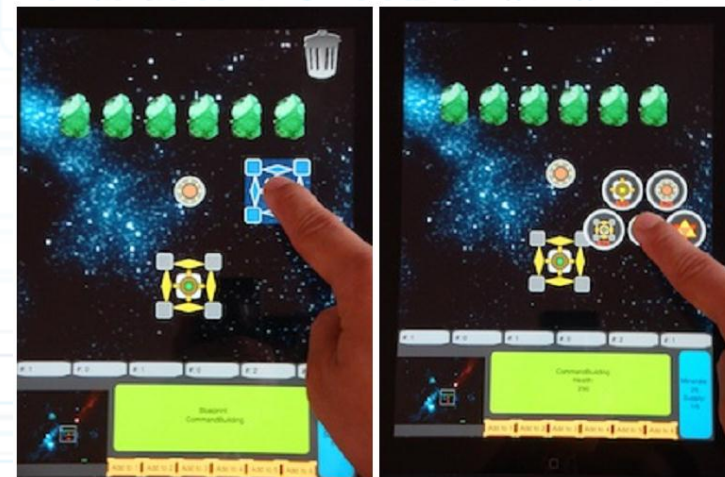
External Multi-touch Panel + Turn-Based Strategy Game
"A Study on Multi-Touch Interface for Game" – Chung-Ang University, Seoul, Korea

Overlayed Multi-touch Screen + Real-Time Strategy Game
"One-handed Interface for Multi-Touch Enabled Real-Time Strategy Games" – University of California, Santa Cruz, CA

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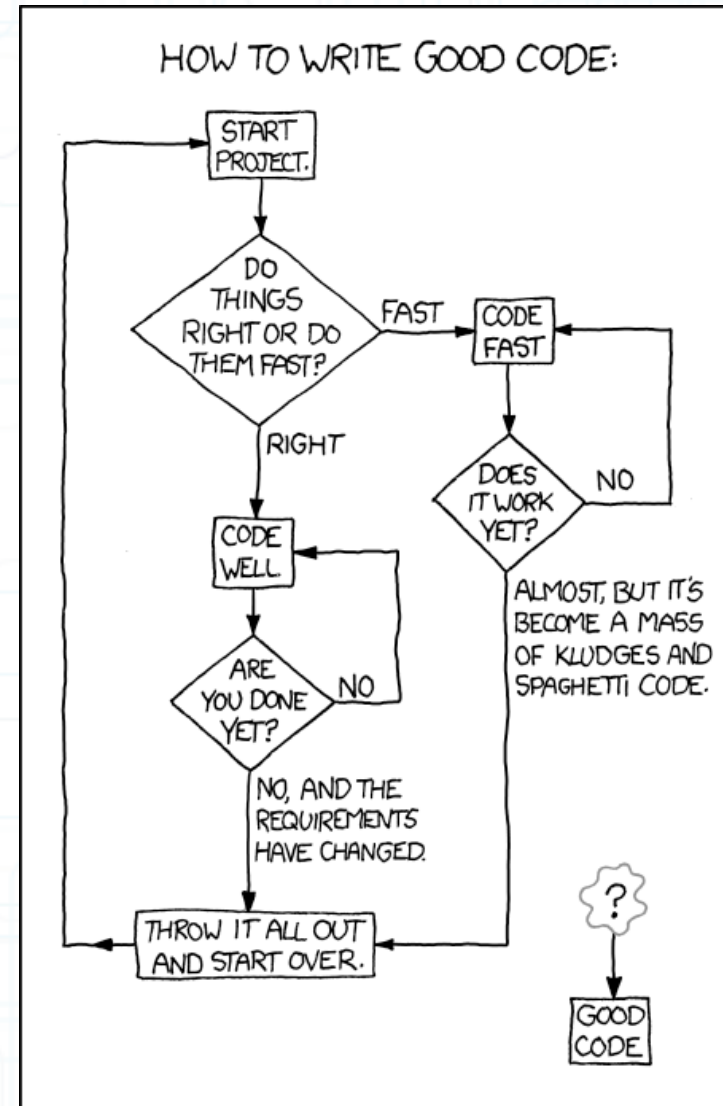
Project Outline

1) Design – Draft
- Interface visualization?
- Categorize/compare?
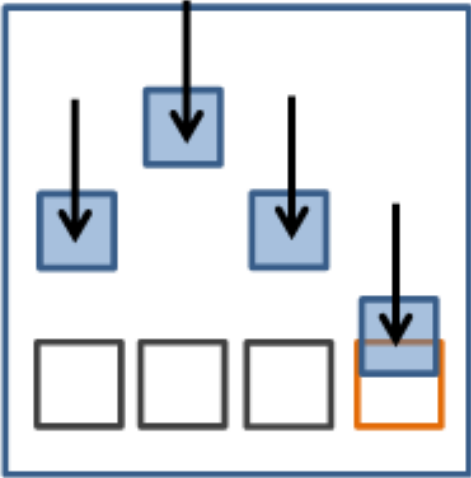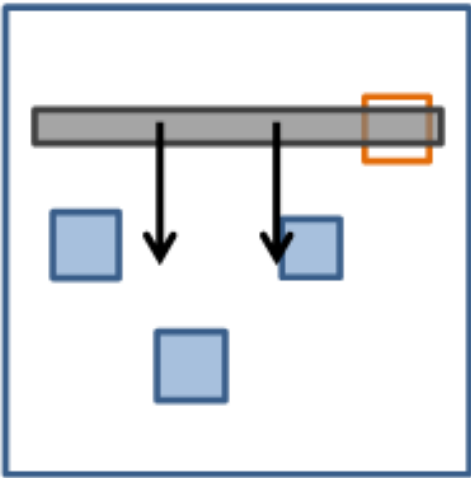- Reduce variables?
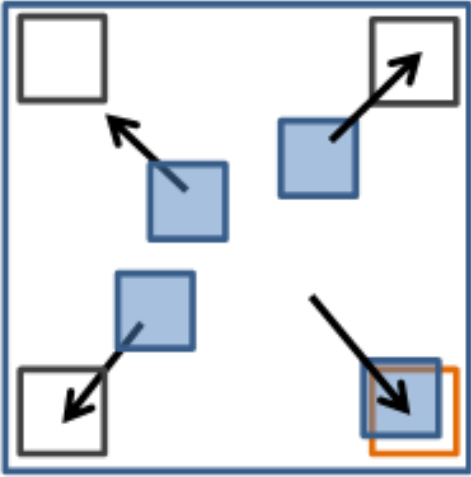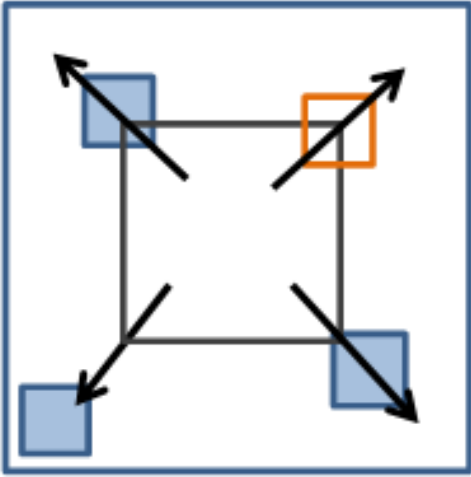
2) Prototype – Code
- Combined app?
- What framework?
- Common engine?
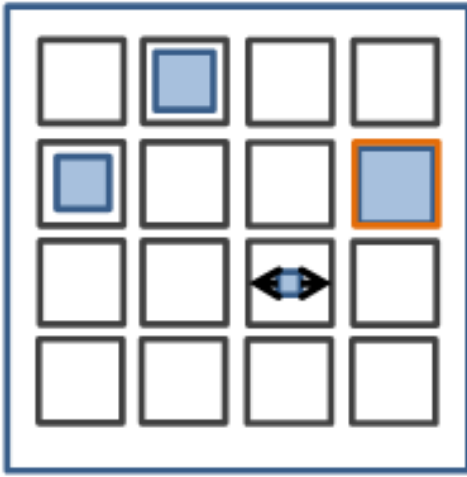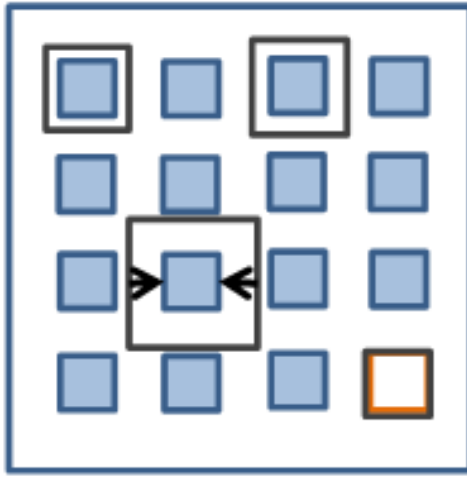
3) Evaluation - Data
- Measurable metrics?
- Sample surveys?
- Compare trends?

HOW TO WRITE GOOD CODE:

START PROJECT.

DO THINGS RIGHT OR DO THEM FAST?

FAST → CODE FAST

RIGHT → CODE WELL

DOES IT WORK YET? — NO

ALMOST, BUT IT'S BECOME A MASS OF KLUDGES AND SPAGHETTI CODE.

ARE YOU DONE YET? — NO, AND THE REQUIREMENTS HAVE CHANGED.

THROW IT ALL OUT AND START OVER.

GOOD CODE

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Design – Interfaces #1-4

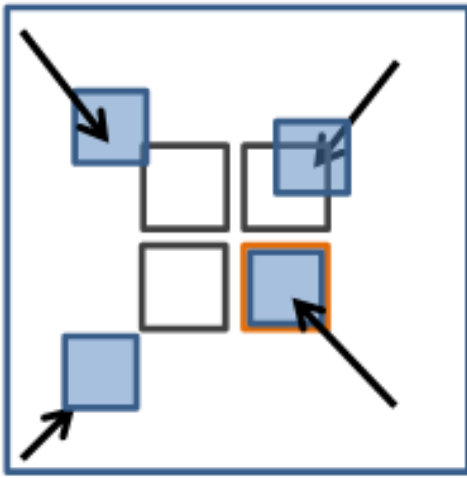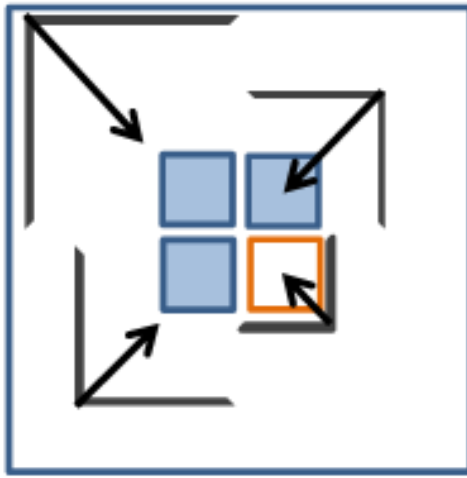| Moving Notes -> Stationary Hitbox		Moving Hitbox -> Stationary Notes	
Diagram	**Description**	**Diagram**	**Description**
	Falling Notes Demo #1, Column style: Columns of points move toward a single line		**Falling Hitbox** Demo #2, Column style: Single line slides down across columns of points
	Spreading Notes Demo #3, Corners: Streams of points move diagonally toward corners		**Expanding Hitbox** Demo #4, Corners: Single box expands toward points along diagonals

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Design – Interfaces #5-8

Moving Notes -> Stationary Hitbox		Moving Hitbox -> Stationary Notes	
Diagram	**Description**	**Diagram**	**Description**
	Focusing Notes Demo #5, Centre Points from corners move toward central area		**Collapsing Hitbox** Demo #6, Centre Box quadrants collapse toward central area
	Filling Notes Demo #7, Grid Independent points expand to fill grid areas		**Shrinking Hitbox** Independent boxes shrink to surround points

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Prototype – Application Layout

20
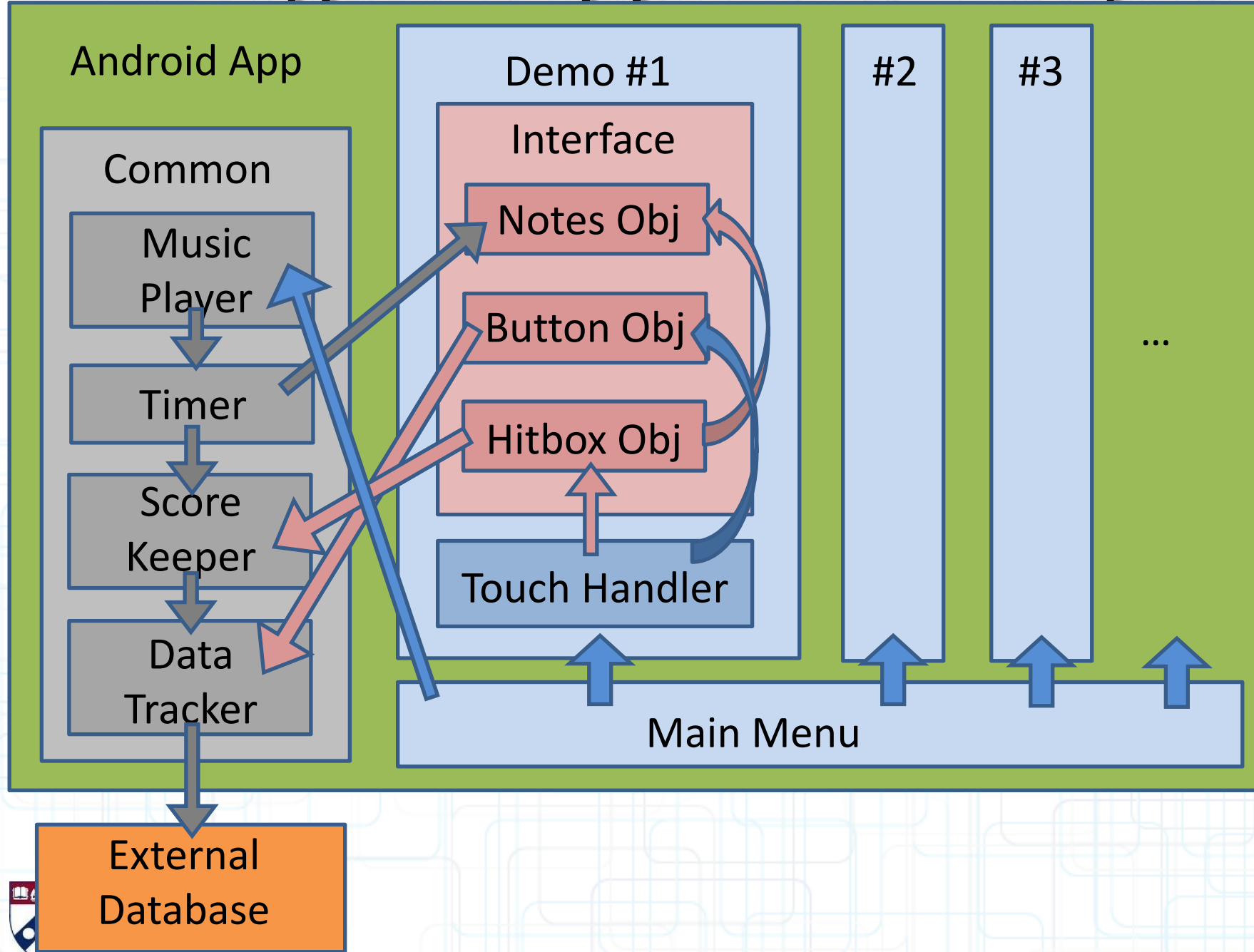
Prototype – Demo Video (WIP)

Beats2: prototypes
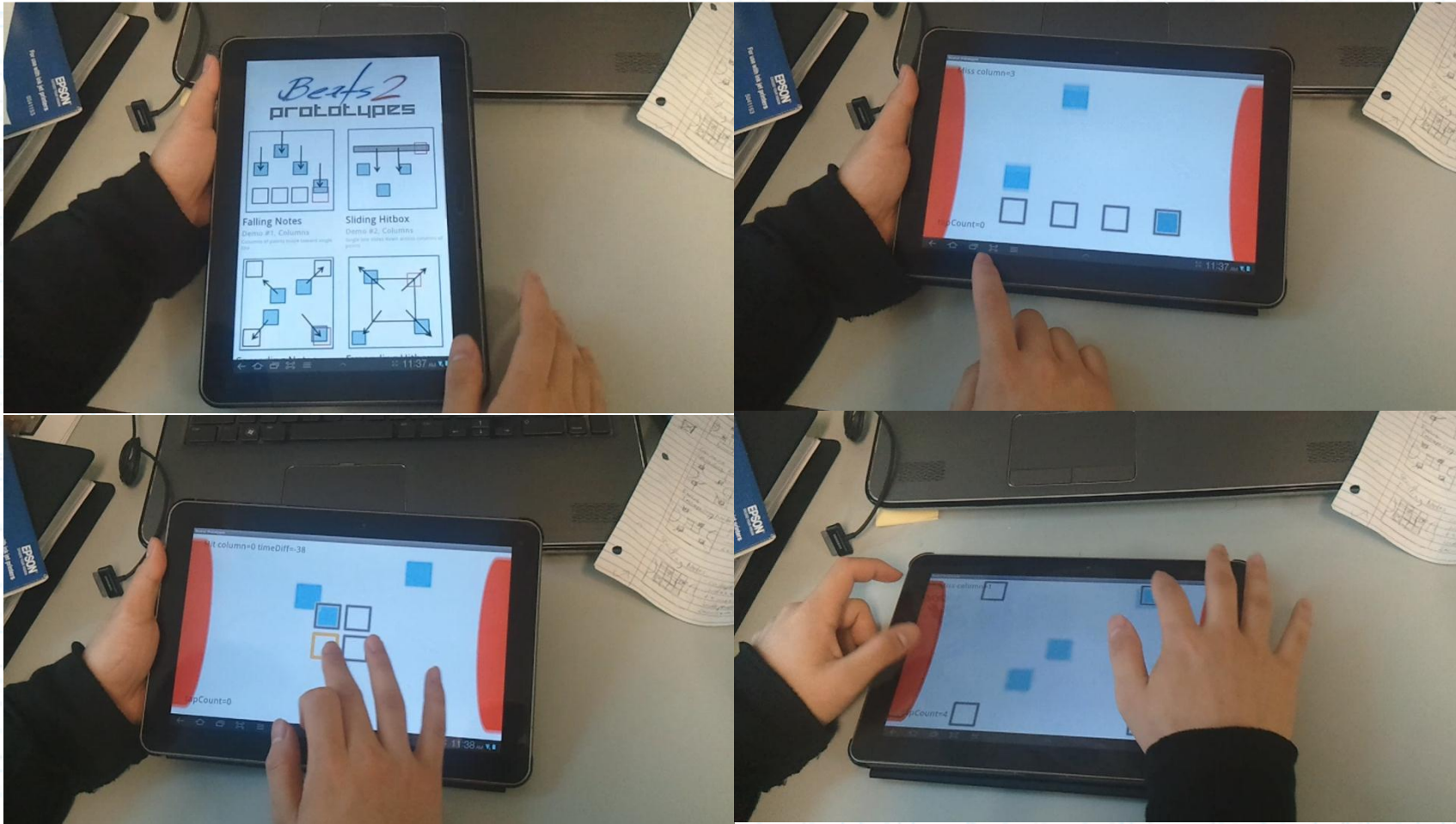
Evaluation

Quantitative Measurements

- Attention load:
    - Button presses count
    - Button press average frequency

- Timing accuracy
    - Note hit/miss count
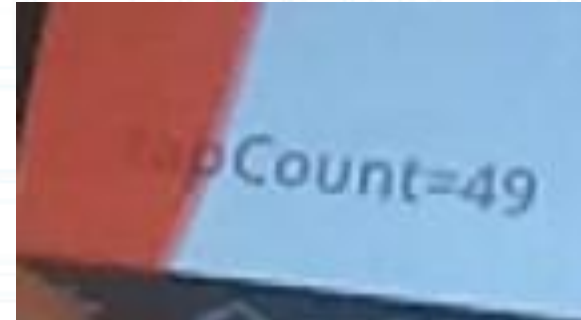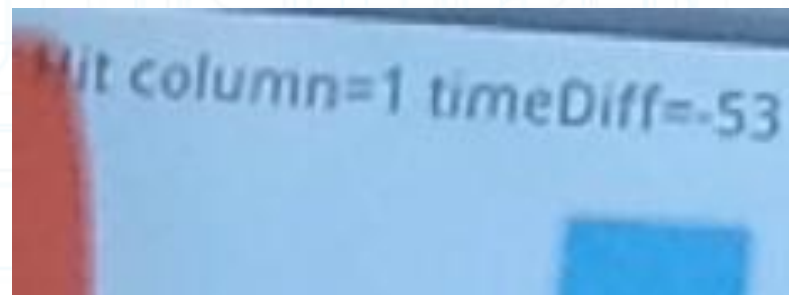   - Note hit average score

- Demo #1 "Falling Notes" = comparison baseline

Evaluation

Qualitative Surveys

* = compare perceived results with qualitative results

Criteria	Description	Rating
Challenge*	Did the demo require lots of skill (e.g. timing with hand-eye coordination)?	Easy --> Hard
Concentration*	Did the demo require a high amount of attention (e.g. less focus on hitting the buttons)?	Low --> High
Fun	Did you enjoy playing the demo (relative to the other demos)?	Boring --> Fun
Mastery	Did you find the demo's interface intuitive and easy to learn/use?	Easy --> Hard
Uniqueness	Did you find the demo's interface and gameplay new and unique?	Old --> New

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# Stretch Goals

Unity3
- Port to Unity3 engine
- Add touch gestures (hold, slide, etc.)
- 2.5D graphics with perspectives
- Desktop and iOS support?

Kinect/Wiimote
- Supported via Unity3 plugin
- Virtual touch grid (depth-based)
- Different input, same overall interface concepts

Beats2
- Support alternate interfaces based on the results of study and user feedback
- Use same base engine
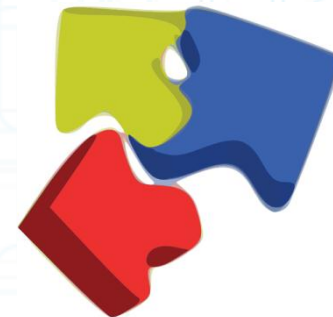
Remaining Work

Work Item	Description	Estimation
Interface demos	Complete interface demos #2, 4, 6, 7, 8 Requires modifying hitbox behaviour Modify graphics loader or add rotation support	3 weeks
Rhythm game engine	Add synchronized music player Add notes data parser (borrow from Beats?)	3 weeks
Data tracker	Add data tracking/survey feedback system (use Google Analytics or custom server?)	2 weeks
Graphics and documentation	Create better, publishable graphics Cleanup and comment code, write documents	1 week
Sample survey	Selective surveying of friends and classmates	1 week
Mass survey	Large-scale surveying via Market publishing	3 weeks
Evaluation	Statistical analysis on collected results	1 week
Report	Write final report, update website	1 week

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Questions?

MercurialMadnessMan 767 points 13 days ago [-]

Sorry, this isn't really a question

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