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Lecture 3

Mobile Gameplay

Focus of Today's Talk

Smartphones

Tablets

Mobile Interfaces

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And In a Few Ways, This

Mobile Interfaces

Challenge: Input Modality

- Don't have standard gamepad controls

  - Add-on hardware is unpopular

  - Not standard, few games use

- Loss of a lot of functionality

  - D-Pads, joysticks for avatar control

  - Buttons for performing core actions

- Have to **rethink game input**

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The Cheap Way Out

Mobile Interfaces

The Cheap Way Out

Takes valuable real-estate (screen covered at all times)

No tactile feedback to user (finger covers visual feedback)

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So What Can We Do?

- (Multi) Touch Controls

  - Pointing, dragging

  - Clicking, selecting

  - More advanced gestures

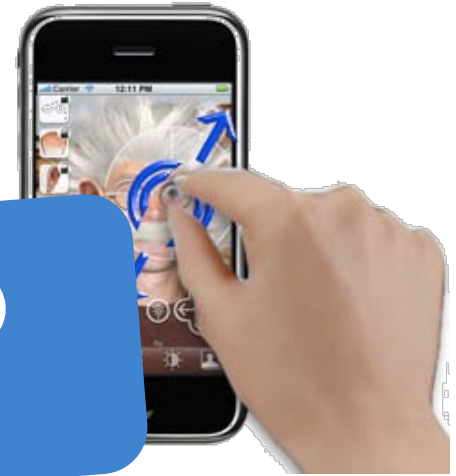- Accelerometer Support

  - Tilting

  - Rotating

So What Can We Do?

- (Multi) Touch Controls
  - Pointing, dragging
  - Clicking, selecting
  - More

- Accelerometer Support
  - Tilting
  - Rotating

AR features (light, camera) are also a possibility.

Mobile Interfaces

Touch: Basic Approach

- Can use touch interface like a **mouse**
  - Touch to click on a point,
  - Trace from touch to drag

- Port mouse-heavy PC/Mac games
  - Particularly strategy games/RPGs

- Keyboard exists, but is limited
  - Have to obscure screen to pull up keyboard
  - Use very sparingly (e.g. save file)

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Example: *Plants vs. Zombies*

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4152 Example: *Gathering Sky*

Mobile Interfaces

Balancing Multitouch

- PC games are "balanced" for a single pointer

  - Multitasking requires a lot of back and forth

  - Challenge is to do actions in an efficient order

- Multitouch eliminates this challenge

  - Fingers everywhere!

  - Movement is fast

  - **Ex**: *Whack-a-Zombie*

Mobile Interfaces

Size Matters

- Small screen makes multitouch *hard*

  - True multitouch only on a tablet

  - Phones are largely limited to gestures

- Fingers are **fatter** than pointers

Mobile Interfaces

Size Matters

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Click here to undo everything

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Click versus Pointing

- PCs use **hover** to give information

  - Gives pop-up menus, tool-tips
  - Used in RPGs, strategy games
  - Major UI design technique

Clear Mind
20 mana, 20 sec cooldown
Magical
Reduces friendly target's Mana costs by
50% for 10 seconds

- There is no hover on mobile!

  - How to distinguish action from info?
  - **Press-and-hold** is becoming the standard
 - So actions must happen on **release**, not press.

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Example: Assassin's Creed Rebellion

Touch: Gestures

- Can also leverage device **gestures**
  - Manipulation strokes common to device
  - **Example**: Pinching for zoom
  - **Example**: Rotating (object, screen)

- Natural for camera control

- **Design Approach**:
  - Think about how used in normal apps
  - How do you leverage this in a game?

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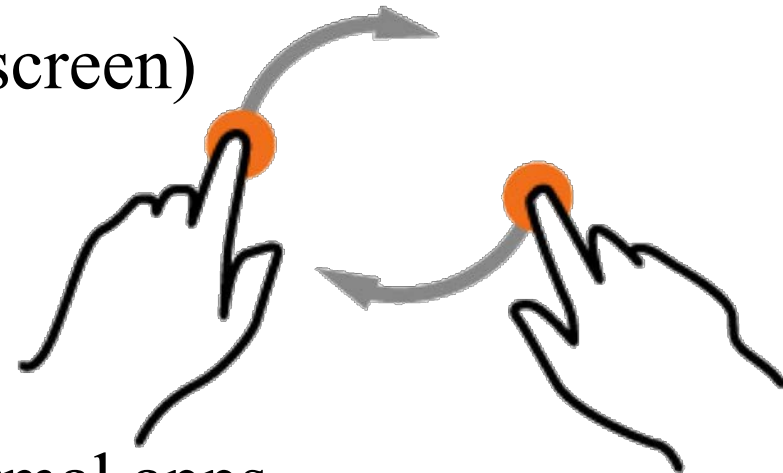
Basic Gestures

Tap

Double Tap

Tap and Hold

Flick

Pinch

Spread

Rotate

Drag (Scroll)

Mobile Interfaces

Simple Multitouch Gestures

Two Fingers

| Tap | Tap/Press | Double Tap | Drag |

Three Fingers

| Tap | Double Tap | Swipe | Drag |

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Simple Multitouch Gestures

Two Fingers

Sort of possible to get position

Tap   **Tap/Press**   **Double Tap**   **Drag**

Three Fingers

Getting position is largely hopeless

Tap   **Double Tap**   **Swipe**   **Drag**

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4152 Example: *Phantom Escape*

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4152 Example: *G.M.P.*

Mobile Interfaces

Touch: Natural Controls

- Successful games strive for **natural controls**
  - Verb controlled by a single movement/gesture
  - Gesture has a very natural physical feel to it
  - Maps naturally on to the action in the game

- **Examples**
  - Cutting   (Cut the Rope)
  - Tracing   (Flight Control)
  - Pulling   (Angry Birds)
  - Twisting   (Monument Valley)

Example: *Cut the Rope*
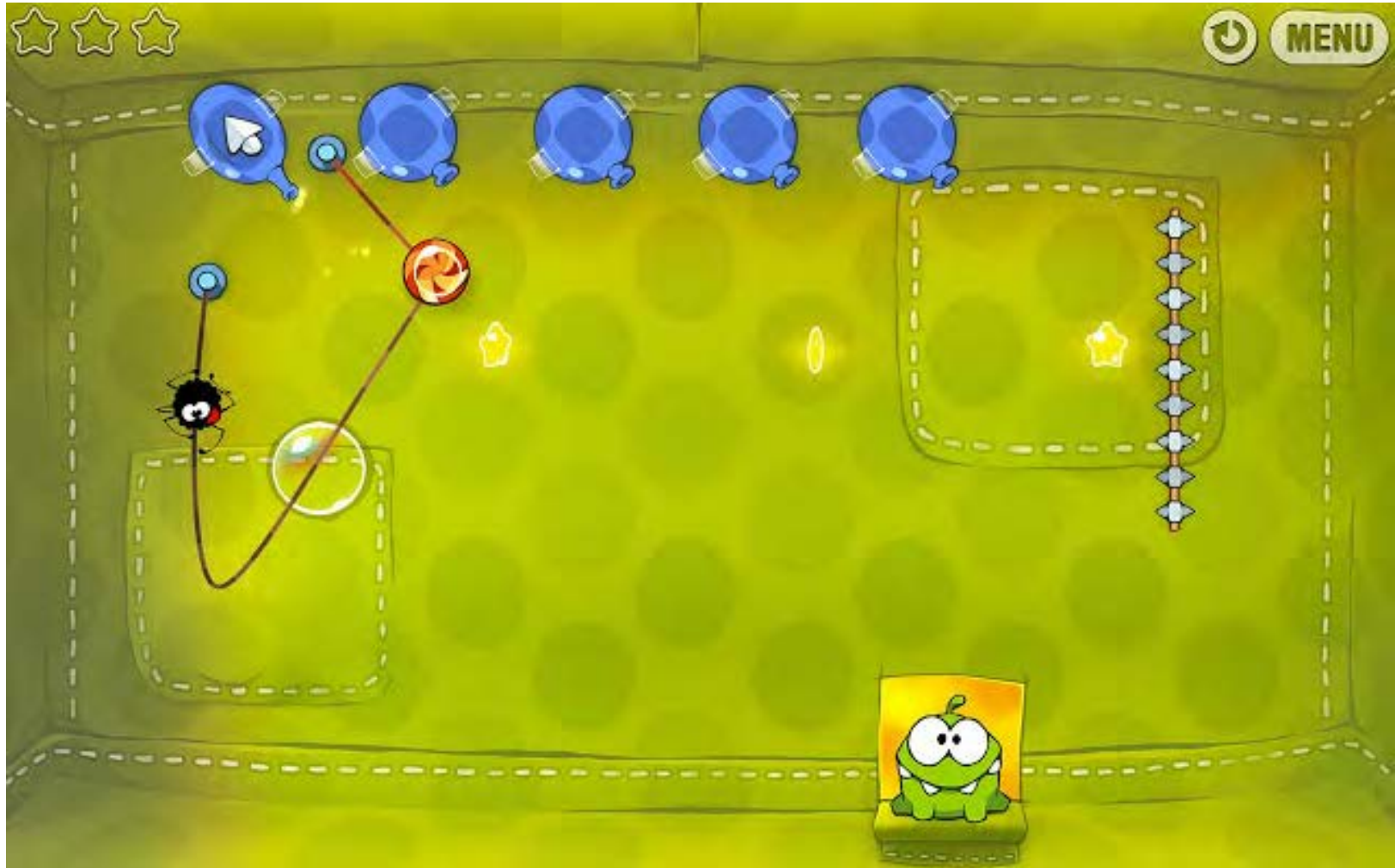
Example: *Flight Control*

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4152 Example: *Flick Ship Spaceship*

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Example: *Zen Bound*

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Example: *The Room*

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Example: *Monument Valley*

Mobile Interfaces

Specialized Gestures: *Infinity Blade*

Draw symbol on screen

Spell is cast when done

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Dollar Gestures

- Recordable gesture API
  - Created a U. Washington
  - Code freely distributed

- Very limited resolution
  - Scales gesture to pixel grid
  - Grid uniquely identifies
  - Shape AND start matter

- **MEng project from 2020**
  - **Planned integration soon**

http://depts.washington.edu/madlab/proj/dollar

Dollar Gestures

- Recordable gesture API
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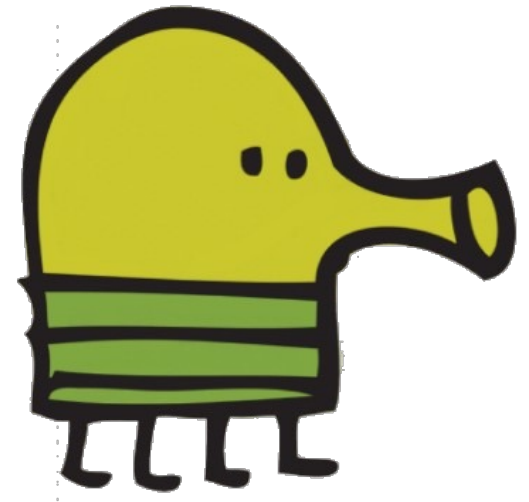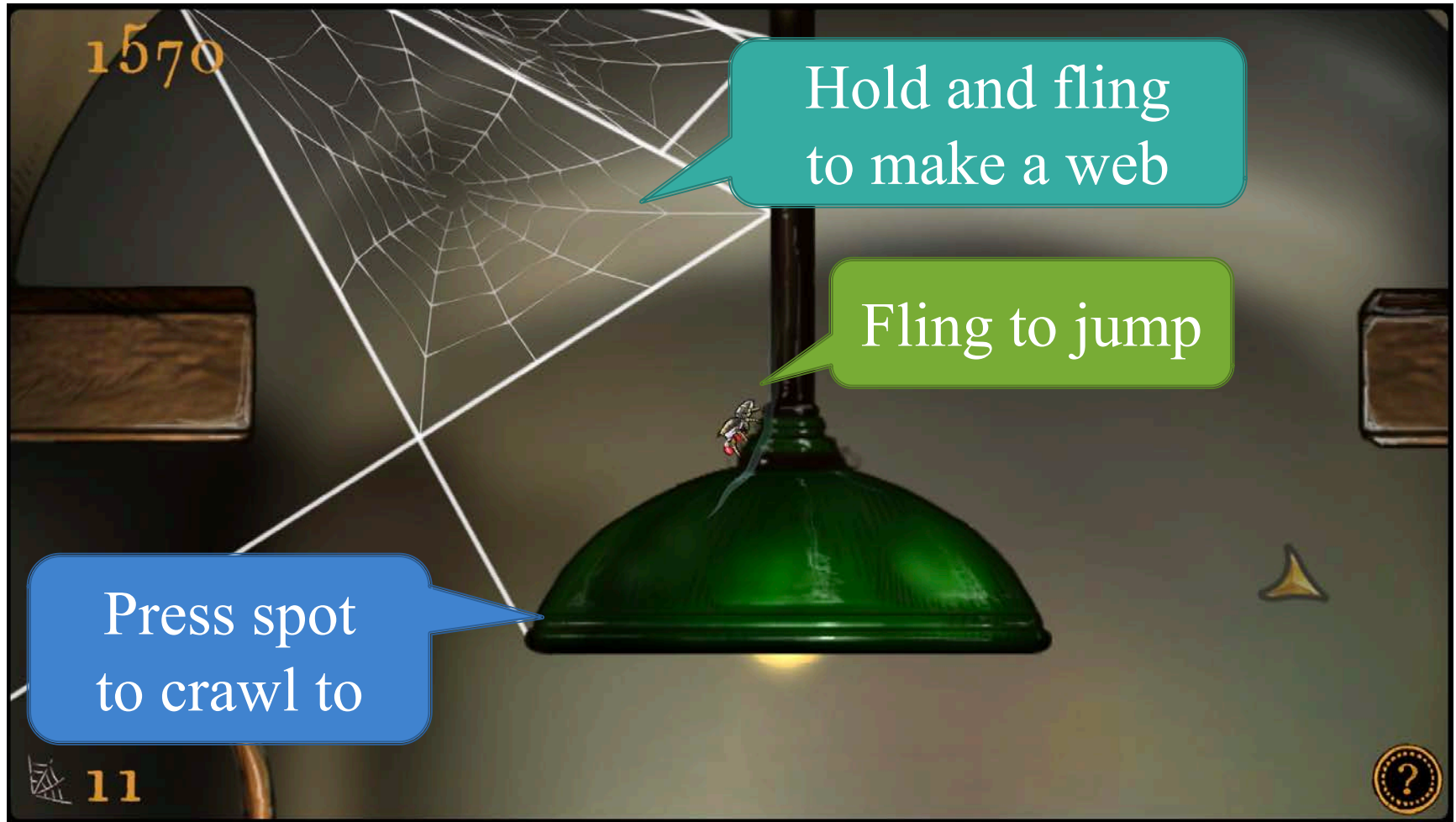- **MEng project from 2020**
  - **Planned integration soon**

Differentiated by **start**, not by shape

http://depts.washington.edu/madlab/proj/dollar

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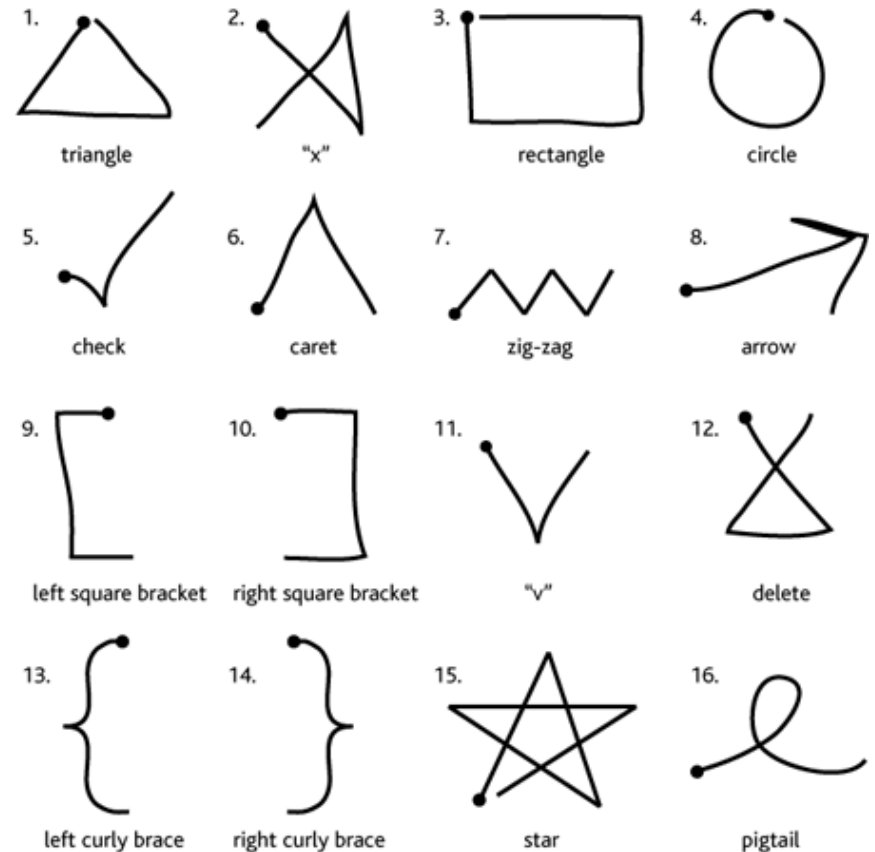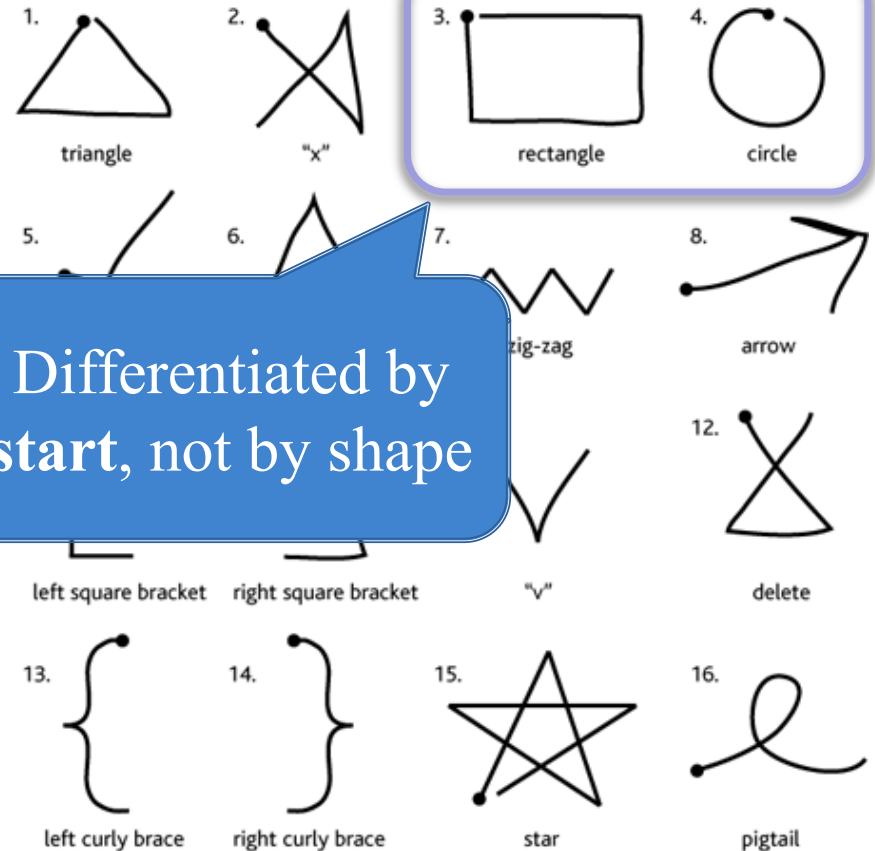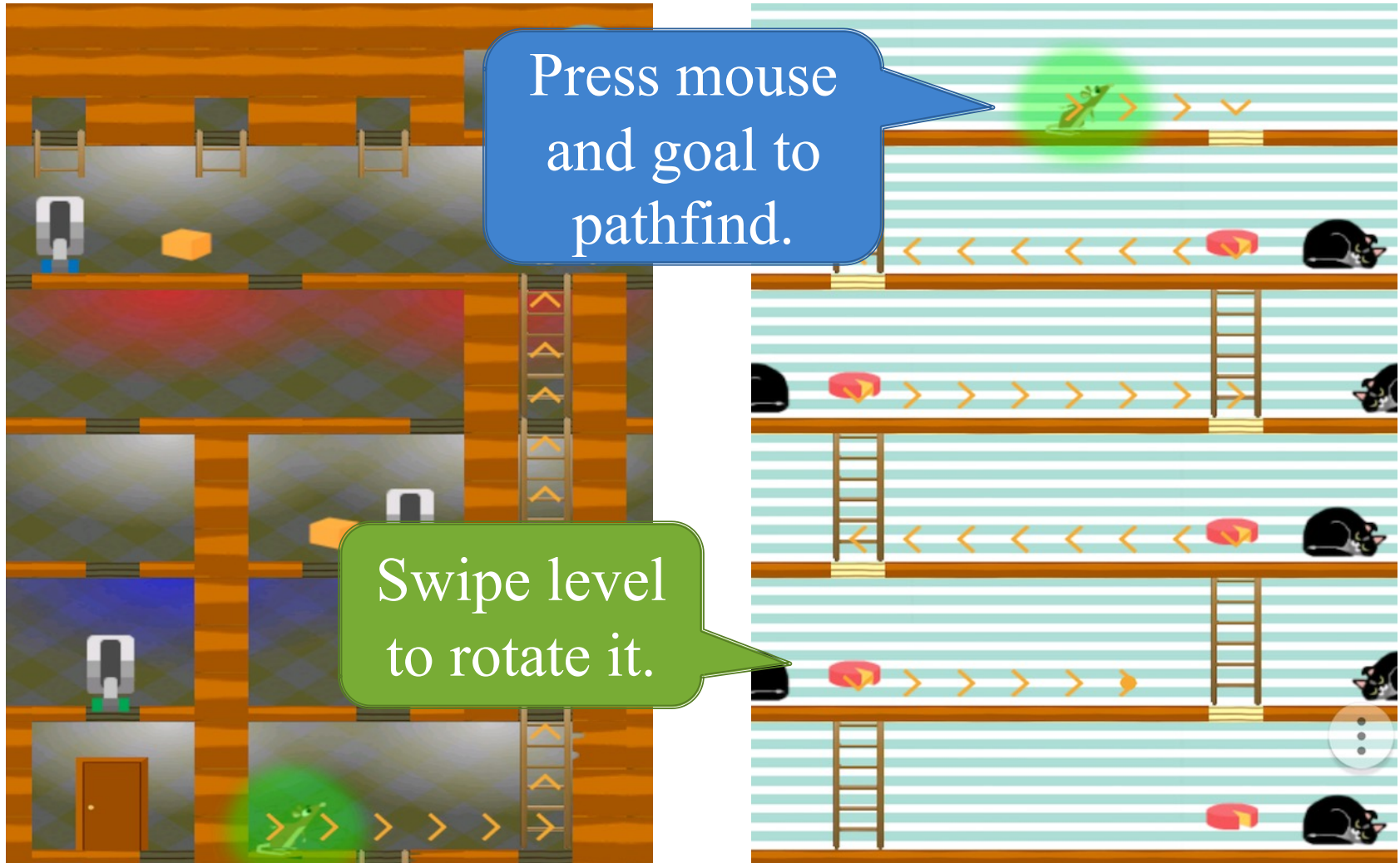
Touch: Avatar Controls

- Several (non-joystick) options for movement
  - Drag the character
  - Point to a waypoint
  - Point to direction

- But how to indicate avatar actions?
  - Want to move and act at same time

- **One Solution**: put actions into movement modes
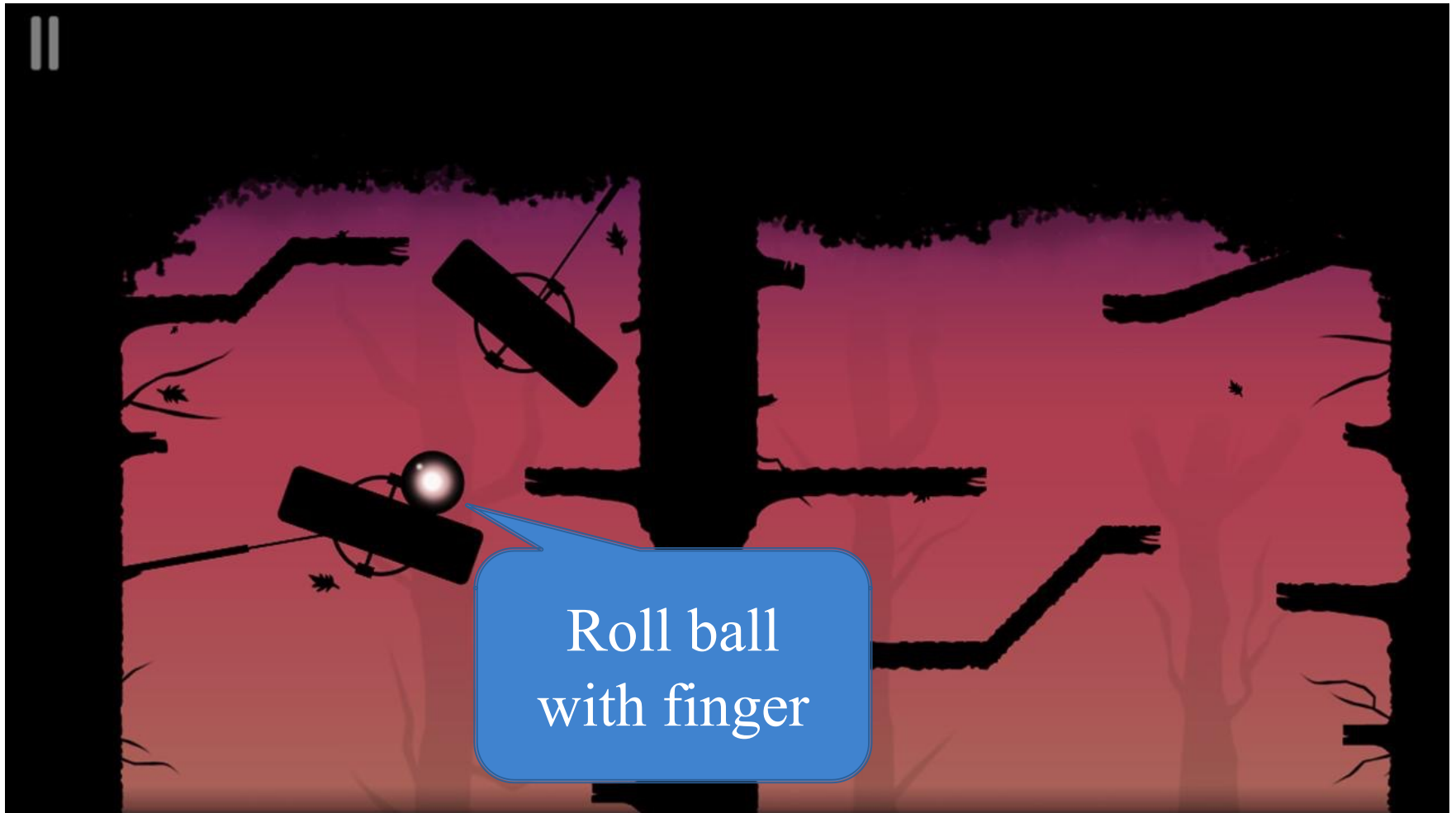 - Drag versus waypoint
  - Press+hold drag versus drag

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Example: *Spider*

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4152 Example: *Squeak & Swipe*

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Early Platformer: *Night Sky*

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Early Platformer: *Type:Rider*

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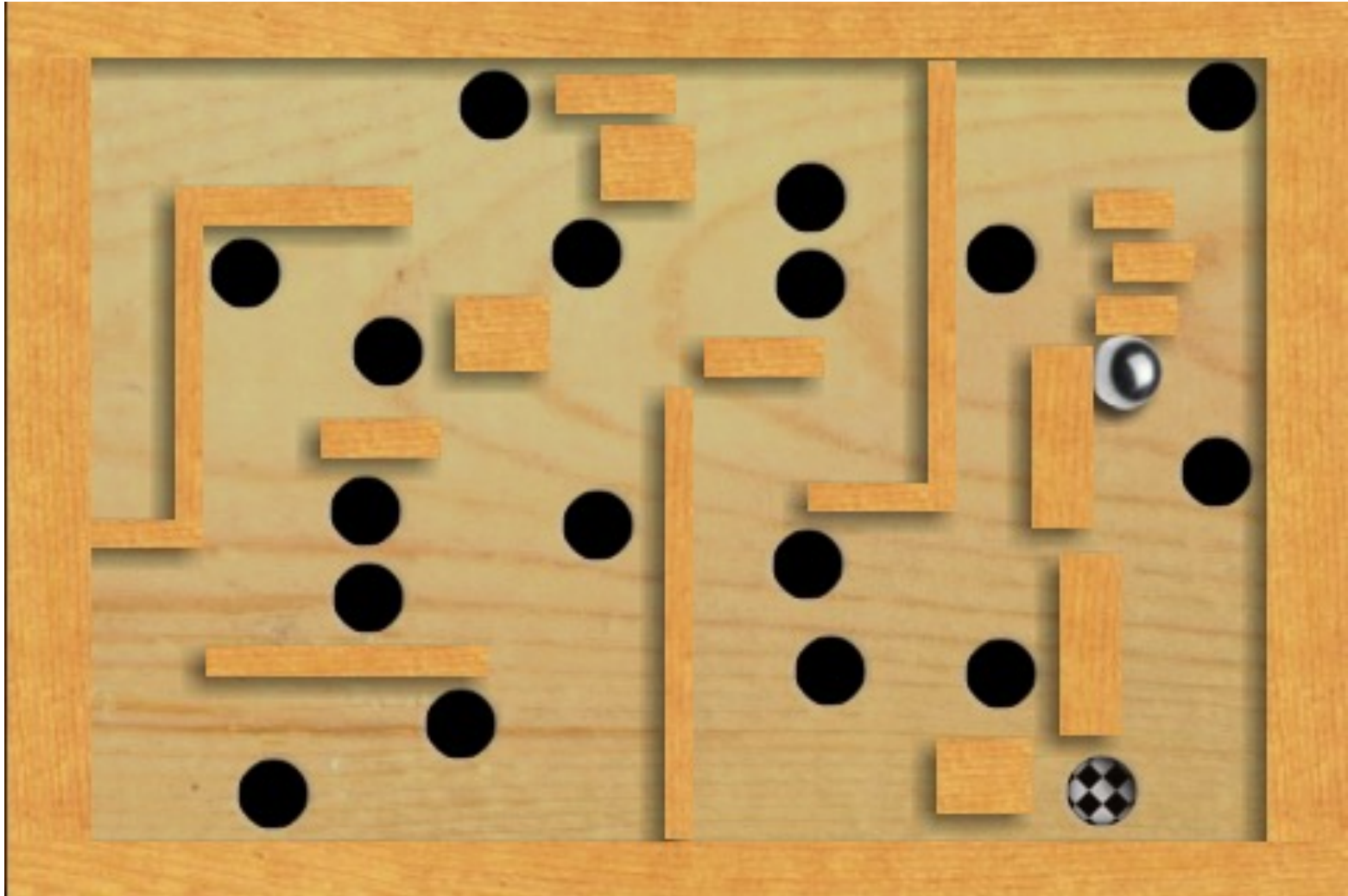# Modern Platformer: *Oddmar*

Mobile Interfaces

Accelerometer: Basics

- **Can** detect rotational movement
  - Rotate from flat plane
  - Rotate around edge

- **Cannot** detect other movement
  - Lateral movement of device
  - Absolute position of device

- Ideal mechanic for
  - Marble-style games
  - Steering/On-rails games

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Example: *Labyrinth 2*

Mobile Interfaces

Accelerometer + Touch

- Solves the problem of actions
  - Use accelerometer for movement
  - Use touch for other actions

- But have to hold the device
  - Hard to gesture as well

- **Idea**: Keep actions unobtrusive
  - Avoid "button mashing" mechanics
  - Allow touch to use thumbs as much as possible

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Example: *Knightmare Tower*

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Accelerometer: Challenges

- The control device is the **display**

  - Extreme controls make game hard to see

  - Even worse when combine with touch

- Even basic movement is a **challenge**

  - Hard to quickly change directions

  - Prone to overcorrection

  - **Example**: *Labyrinth*

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Accelerometer: Orientation

- Can detect device orientation
  - Either portrait or landscape
  - Use for different game modes

- *Sword & Sworcery EP*
  - Landscape for exploration
  - Portrait for combat

- Supported in SDL/CUGL
  - 3rd year in CUGL
  - Add listener to Display

Mobile Interfaces

Example: *Flipped Out!*

Mobile Interfaces

What About the Steam Deck?

Touch screen: **Yes**
Accelerometer: **No***

Mobile Interfaces

Final Word: Know Your Audience

- **Phone games** are meant for "quick play"
  - Must be able to start, play, and save in 2 minutes
  - Should be able to pick up where left off quickly
  - Controls should be (relatively) simple

- **Tablet games** can be more complex
  - Supports longer play units (why?)
  - Larger screen permits more complex controls
  - Games are closer to PC indie games
  - And can also cost more!