CS/INFO 4154:
Analytics-driven Game Design

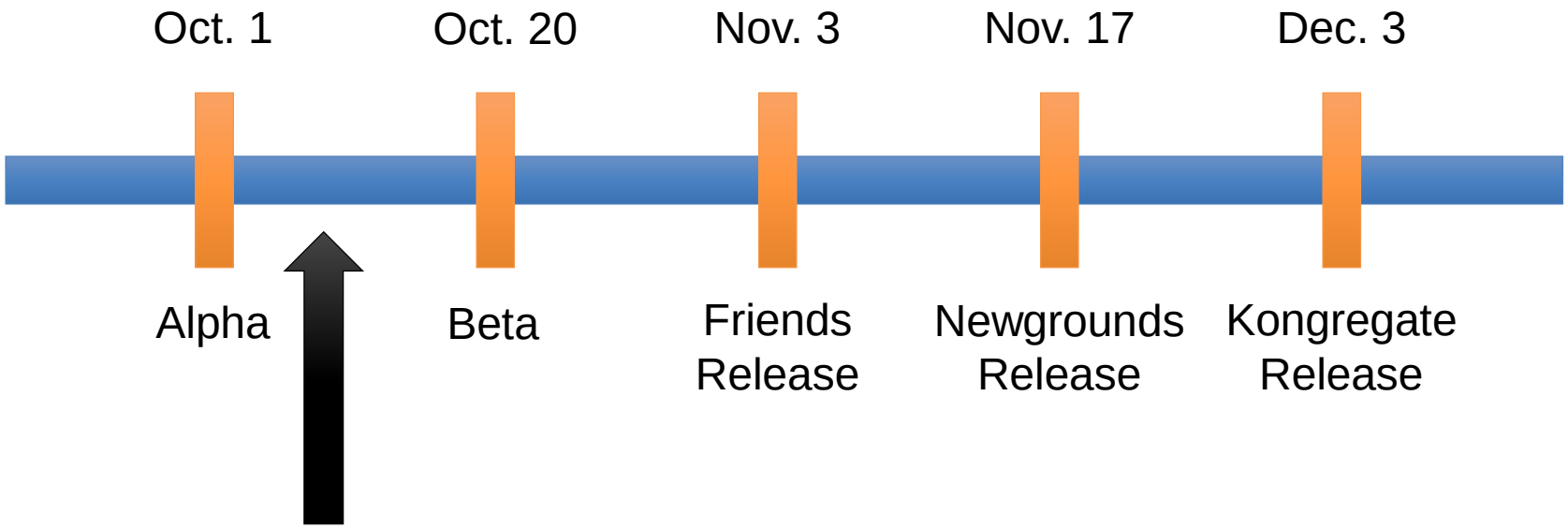
Lecture 9:

Data Collection

Revised Plan

- Due ***tonight*** at 11:59pm
- Plan for the Beta deadline (10/20)
- Instructions are on website
- ***Just the plan*** from the game design document

Schedule


Oct. 1
Oct. 20
Nov. 3
Nov. 17
Dec. 3
Alpha
Beta
Friends Release
Newgrounds Release
Kongregate Release

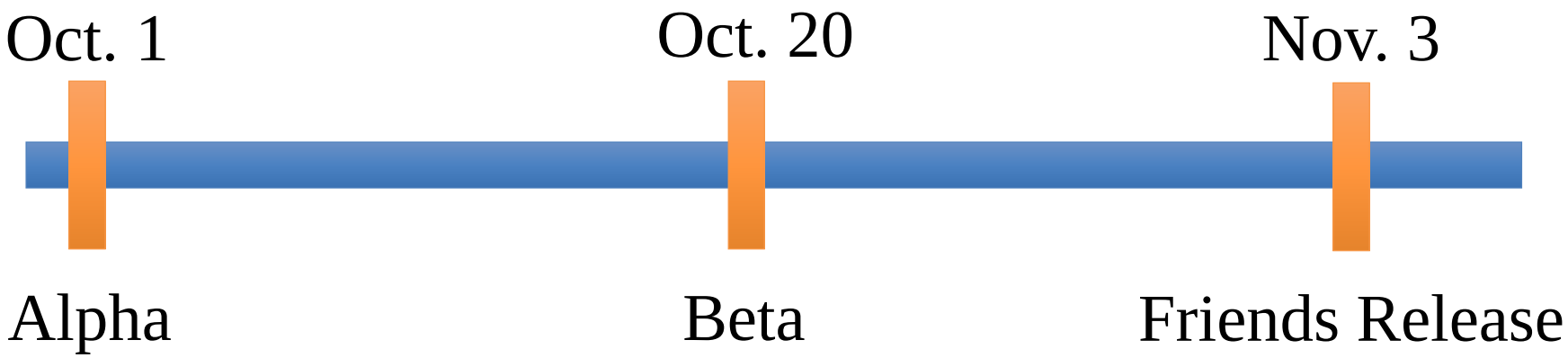
Alpha Prototype

- Minimum to accept/reject the idea
- Answer key questions (is it fun?)
- Requirements
  - three levels: easy, medium, hard
  - core game mechanics for these levels
  - minimal art/UX integrations

NOT needed for Alpha Prototype

- More than three levels
- Game mechanics not needed for these levels
- **Tutorials**
- Music
- Sound effects
- Full art integration
- Full user interface
- Logging

Schedule



- **Learnability**
- **Progression**
- **Content**
- **Logging**

Beta Prototype: Learnability

- Goal: users can play ***without any help from you***
- Requirements
  - Fixes discussed during team meetings
  - ***Smooth progression*** of eight[1,2] levels
  - Reinforcement and recombination
  - Tutorial messages

[1] negotiable

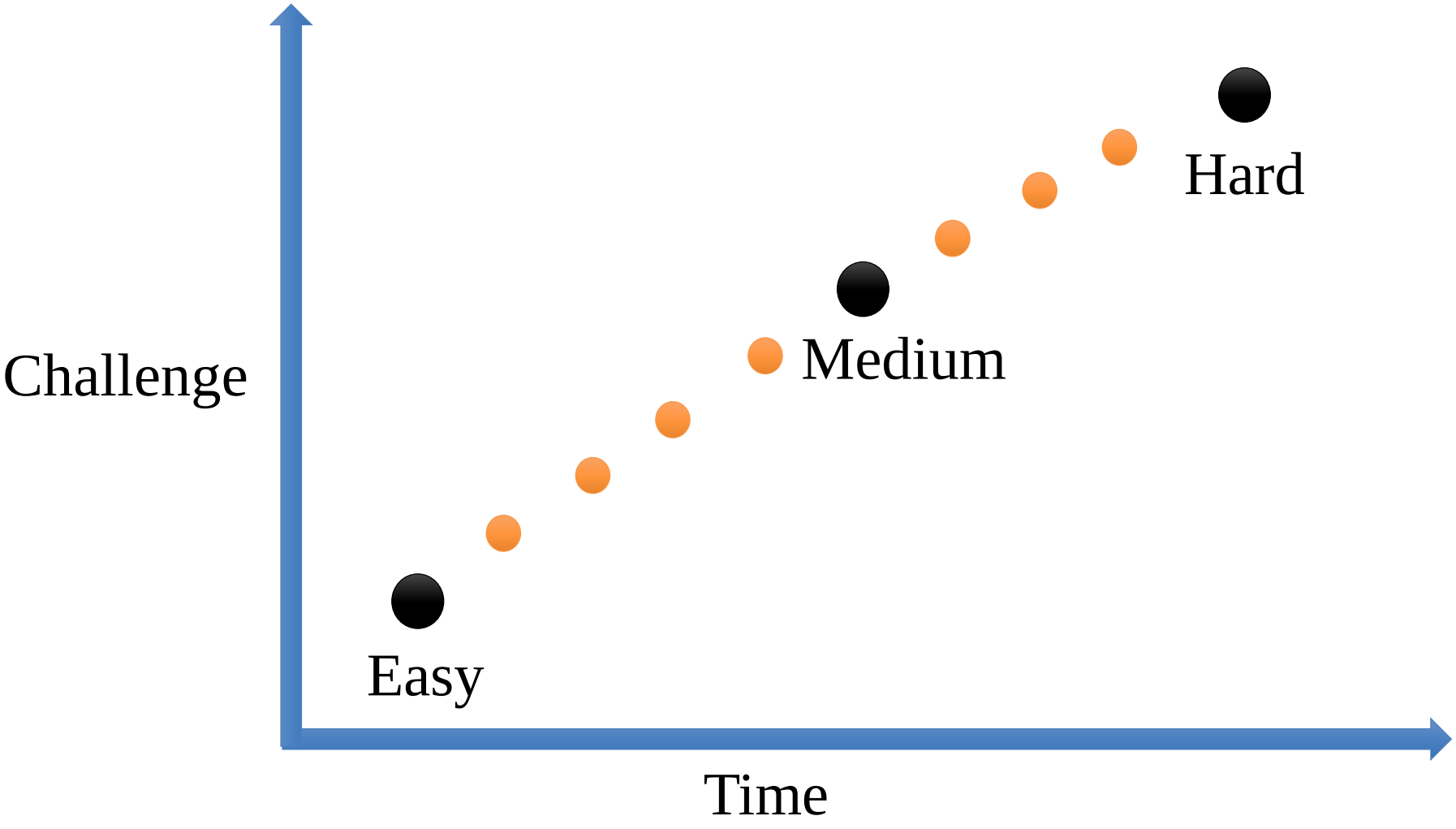
[2] equivalent to:

- ten levels in *Box!* or *Thermo* or *Zombify*
- six levels in *That's How We Roll* or *Nameless Tactics*
- two levels in *Epic's Epic Epic*

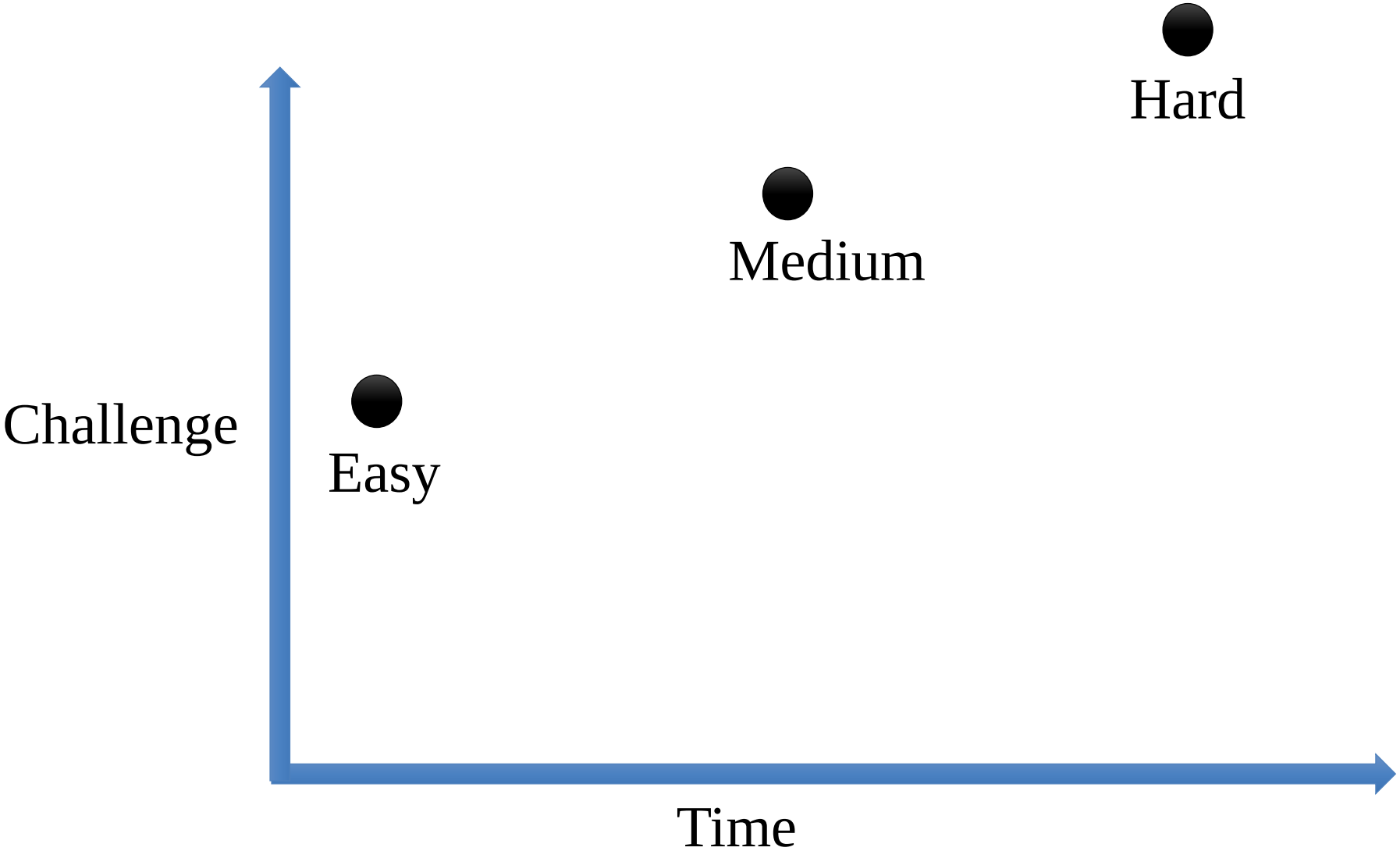
NOT needed for Beta Prototype

- More than eight levels
- Game mechanics not needed for these levels
- Music
- Sound effects
- Logging

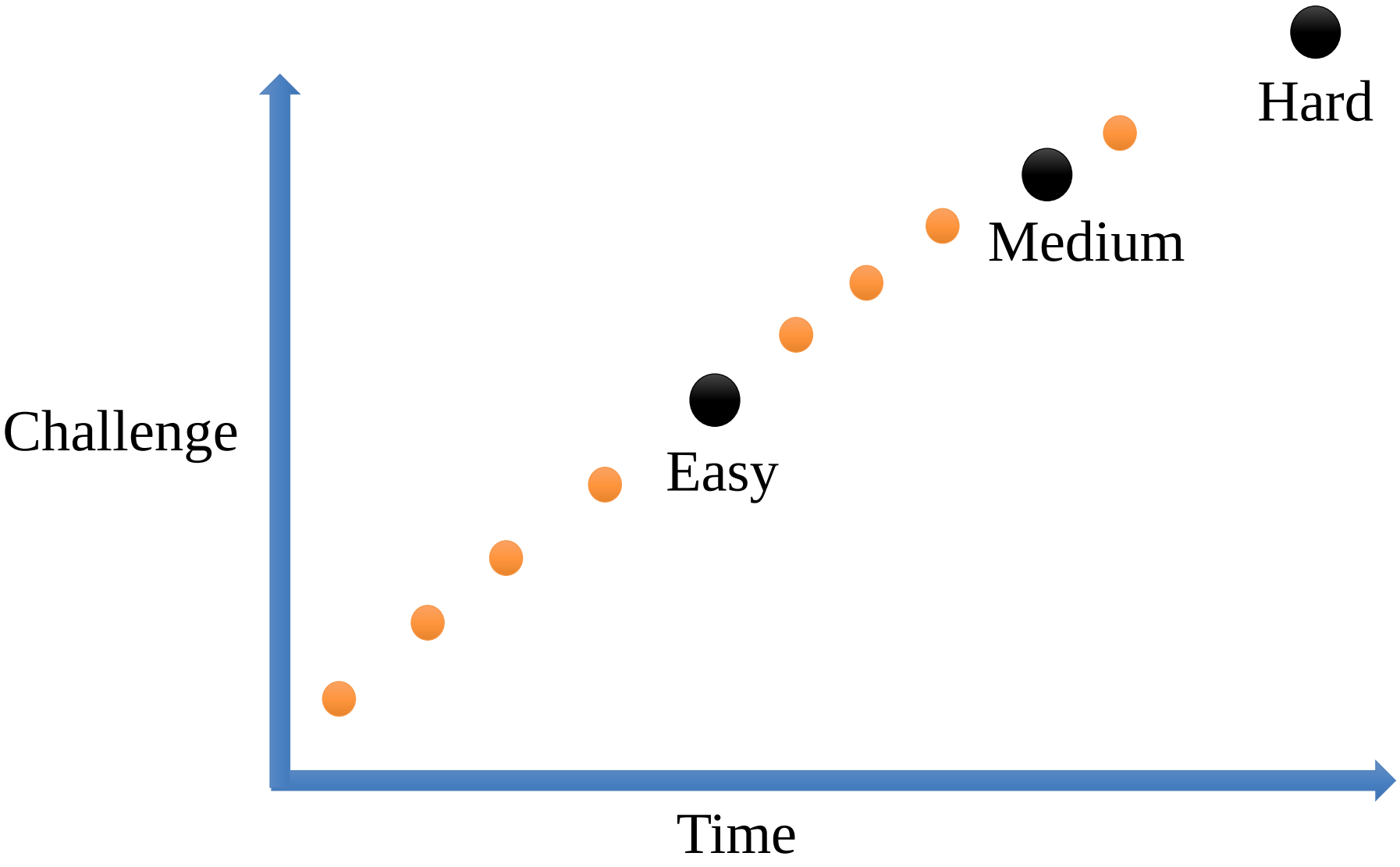
Beta Level Progression



Beta Level Progression

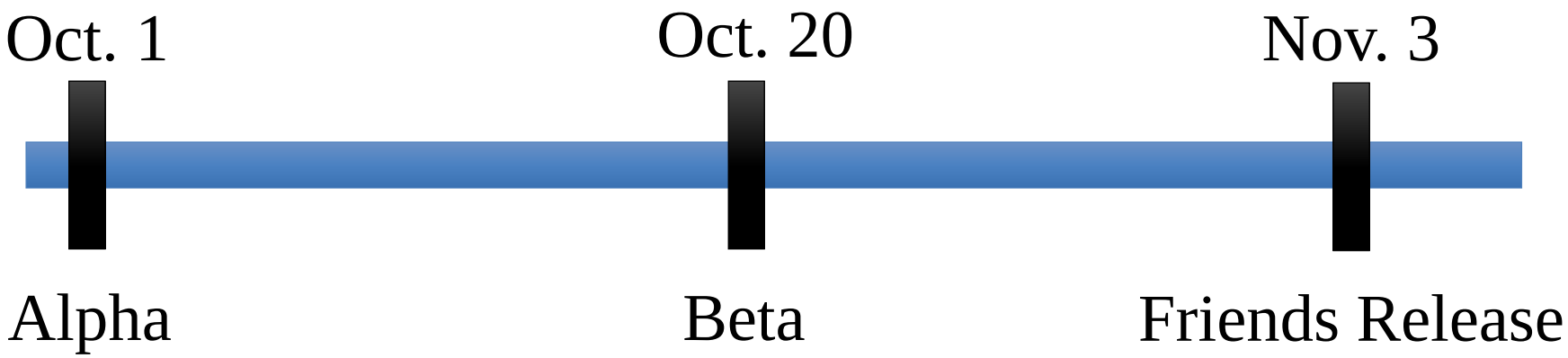


Beta Level Progression



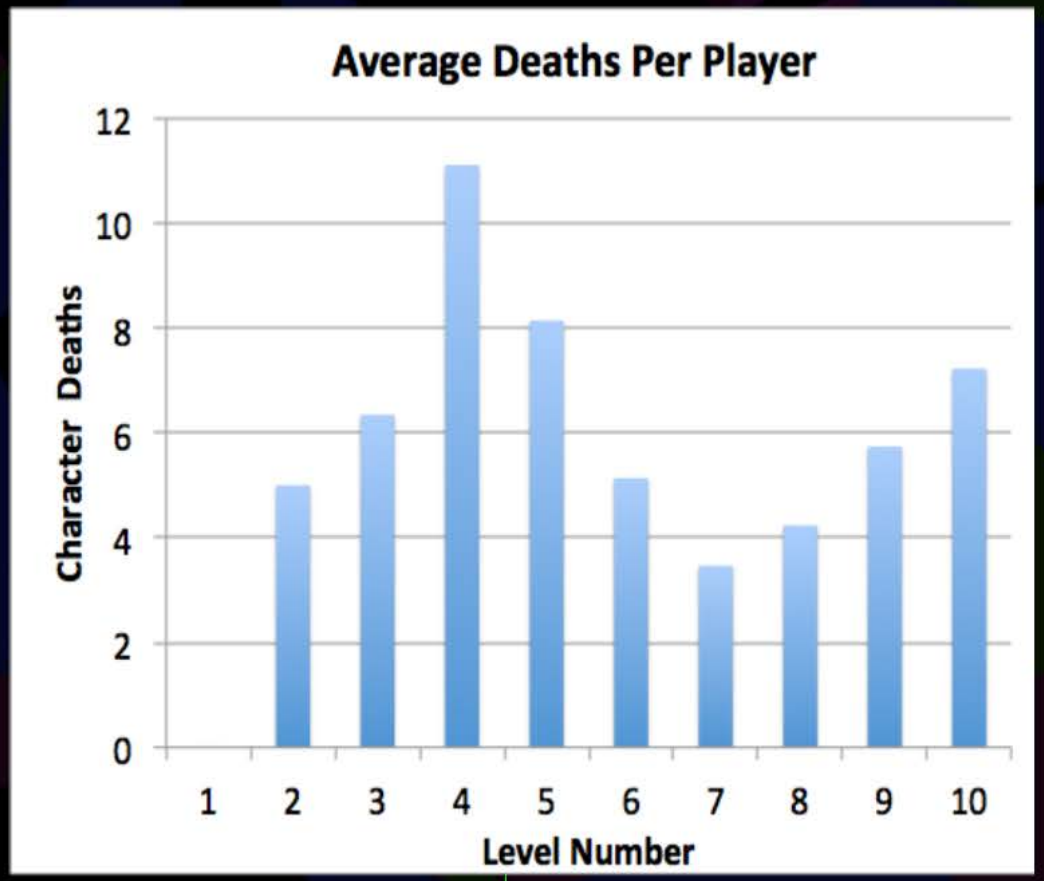
Examples of Betas

Schedule

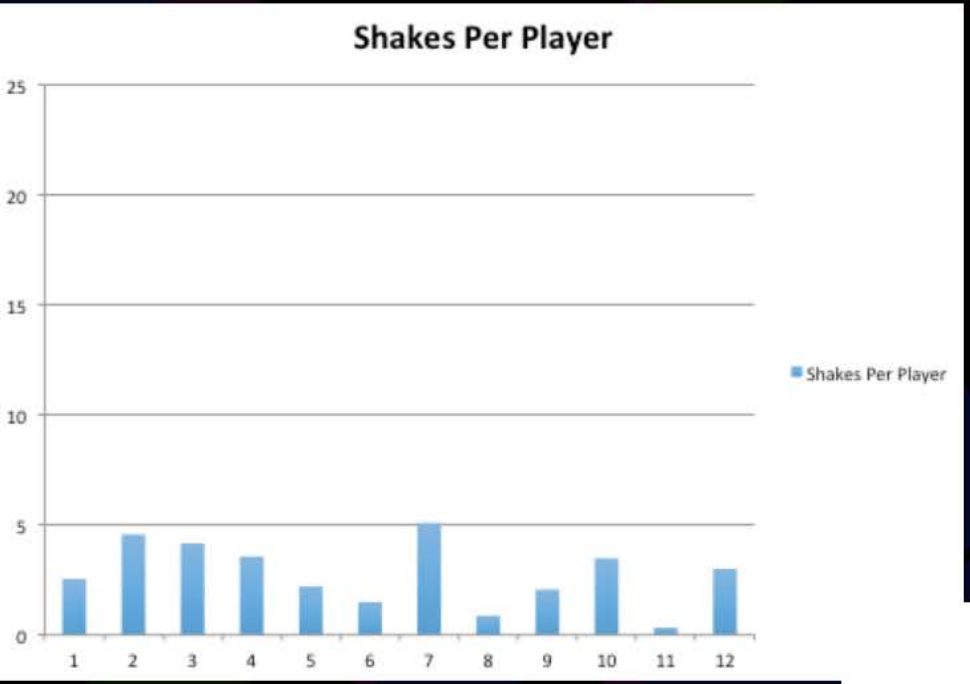


- **Learnability**
- **Progression**
- **Content**
- **Logging**

Friends Release: Too Much Death

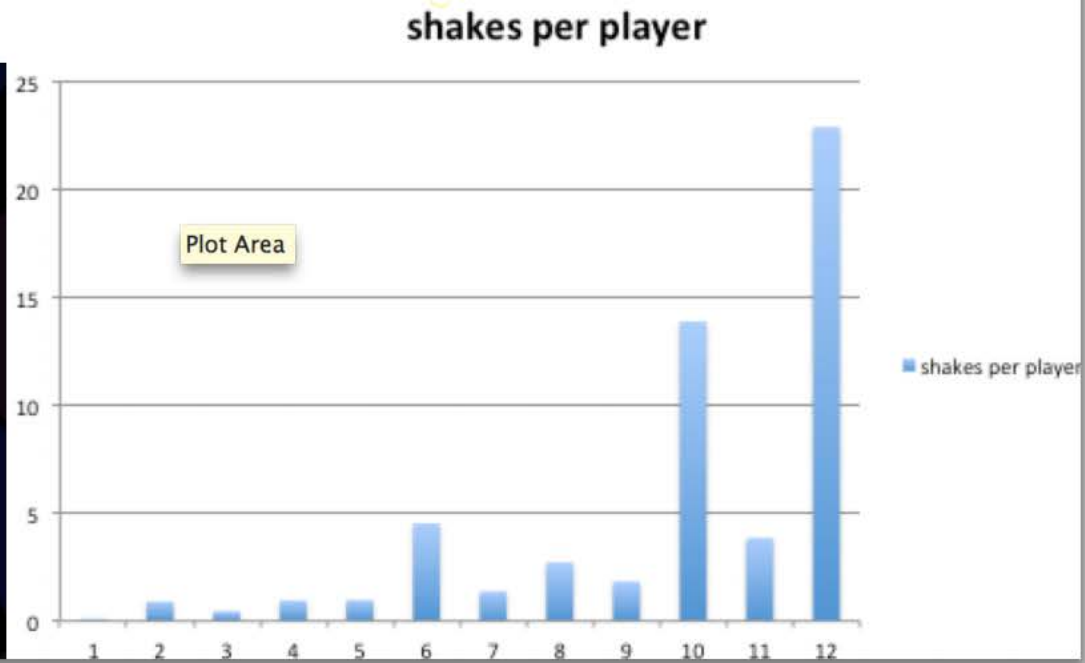


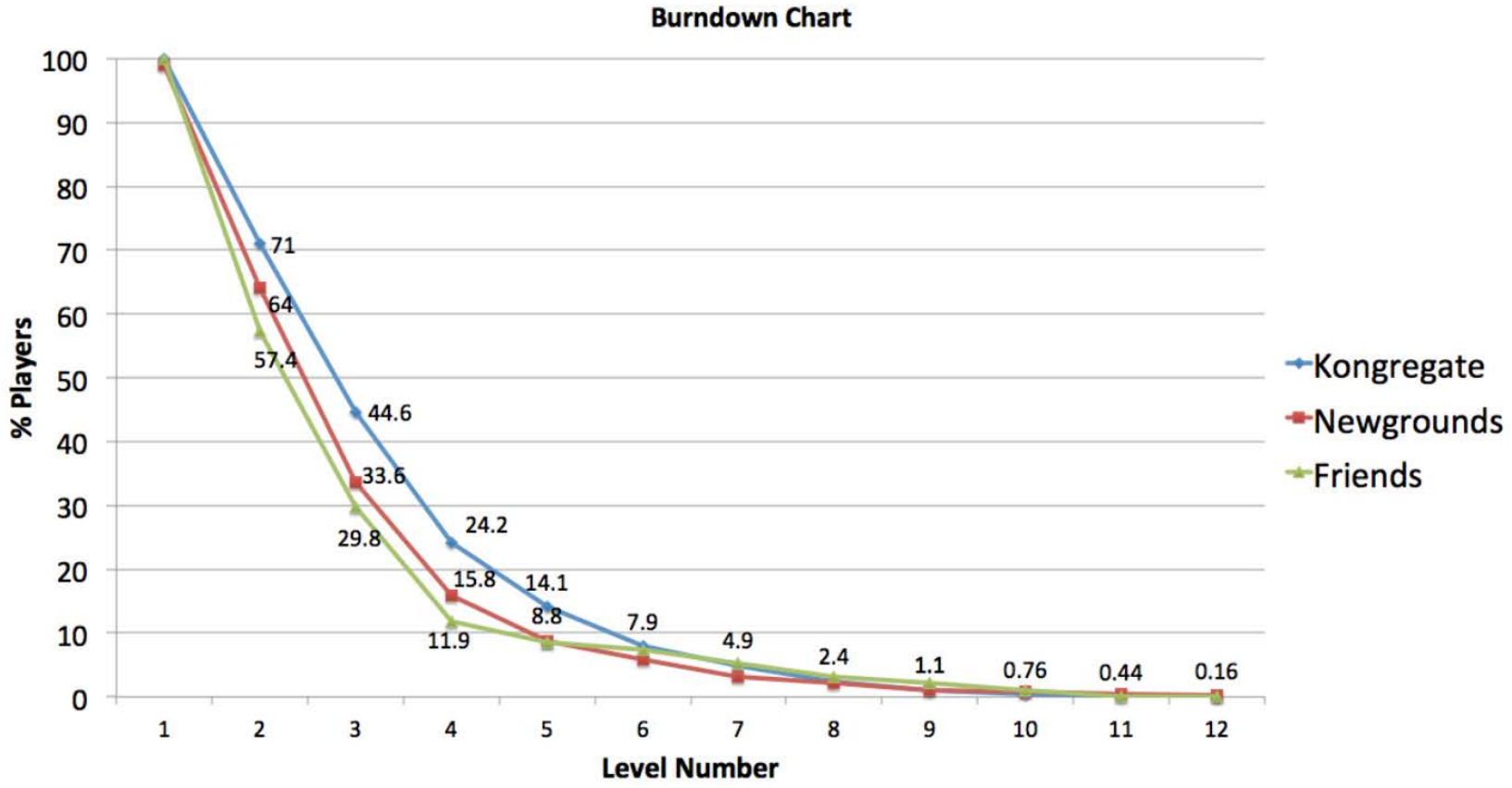
Kongregate: Use of Shake



Kongregate

Newgrounds




Burndown Chart
% Players
100
90
80
70
60
50
40
30
20
10
0
71
64
57.4
44.6
33.6
29.8
24.2
15.8
11.9
14.1
8.8
7.9
4.9
2.4
1.1
0.76
0.44
0.16
1
2
3
4
5
6
7
8
9
10
11
12
Level Number
Kongregate
Newgrounds
Friends

What are the challenges in logging?

Ideally

Time	Event
9:00am	Starts game
9:01am	Starts level 1
9:01-9:10am	Completing level 2
9:11am	Starts level 2
9:11-9:17am	Completing level 2

Reality

Time	Event
9:00am	Starts game
9:45am	Starts level 1
9:45-9:55am	Random actions in level 1
9:55am	Restarts level 1
9:56am	Restarts level 1
9:57-10:04am	More actions in level 1
10:04am	Boss walks in. Minimizes game and acts like he is working.
2:55pm	Maximize game, resume level 1

What are the challenges in logging?

- Sporadic and unexpected player behavior
- Events can get dropped
- Limited space
- Spikes in demand

Principle 1: Record what you need

- Consider ***decision-significant*** information
- Consider your analysis questions

The Ground Beneath Her Feet

Move the platform across the pit and then go back in time so the goomba will land on the platform and walk across. He will get the key from the tiny space for you. Grab the first puzzle piece and move on.

The Ground Beneath Her Feet

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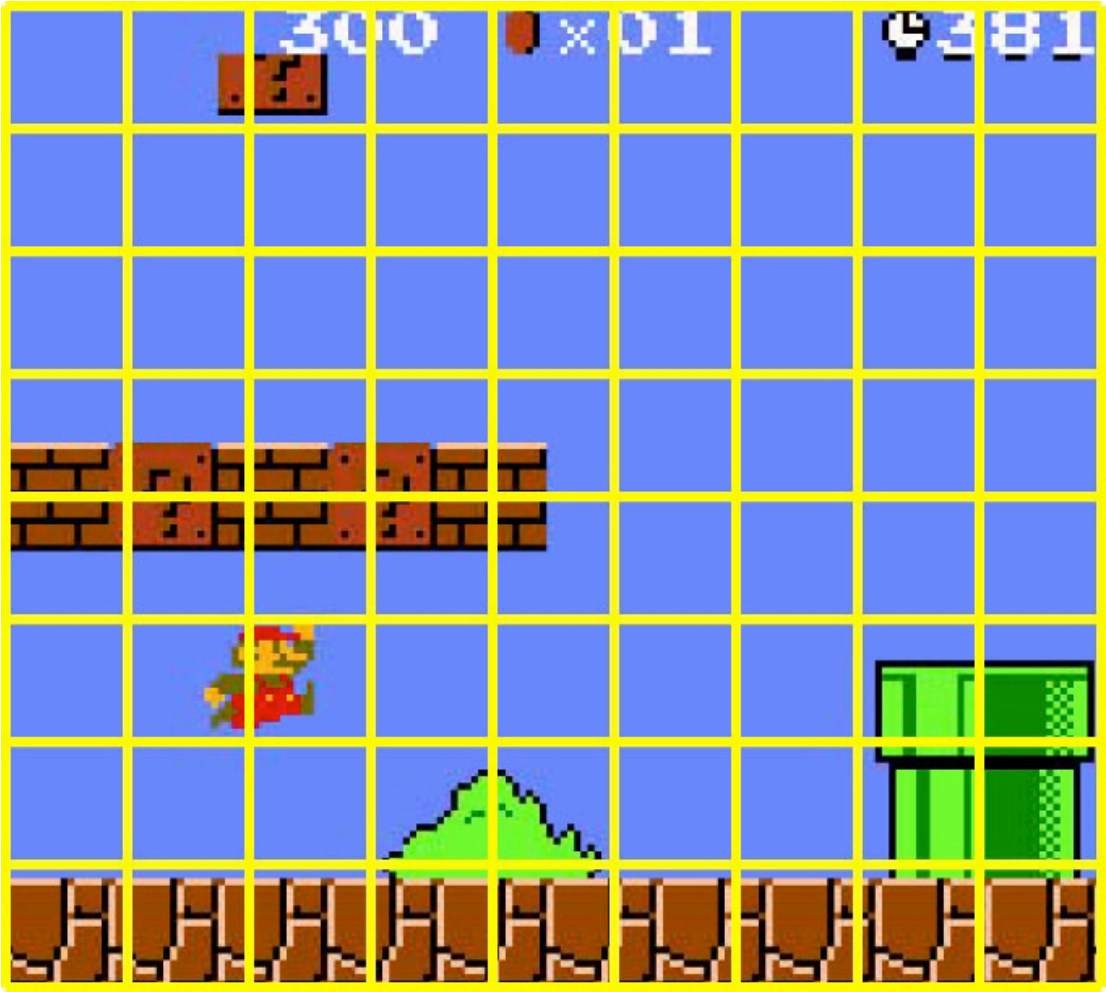
Recording Movement

Ways to do this

- walk_right walk_right walk_right walk_right walk_right walk_right walk_right walk_right walk_right walk_right walk_right walk_right walk_right walk_right
- walk_right (3 seconds)
- player_at(1, 1) player_at(1, 1) player_at(1, 1) player_at(1, 1) player_at(2, 1) player_at(3, 1)
- player_at(1, 1) player_at(2, 1) player_at(3, 1)

Discretizing Space



Discretizing Space

Recording Health

- Player health dropped to 99%
- Player health dropped to 98%
- Player health dropped to 97%
- Player health dropped to 96%
- Player health dropped to 80%
- Player health dropped to 60%
- Player health dropped to 40%
- Player health dropped to 20%

Key events

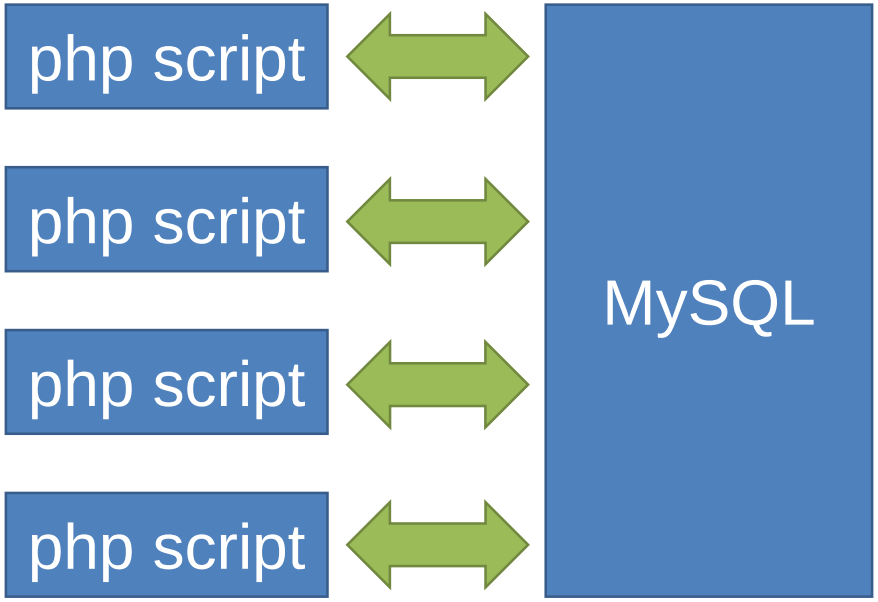
Key events

Principle 2: Failsafes

- Events sometimes get lost
  - Server load spikes
  - Black holes in the internet
- Mistakes get made
  - You forgot to record something important
- Need some redundancy
  - Record absolute information, not changes since last event
  - Periodically report the entire game state

GDIAC logging framework

- Located on gdiac.cs.cornell.edu



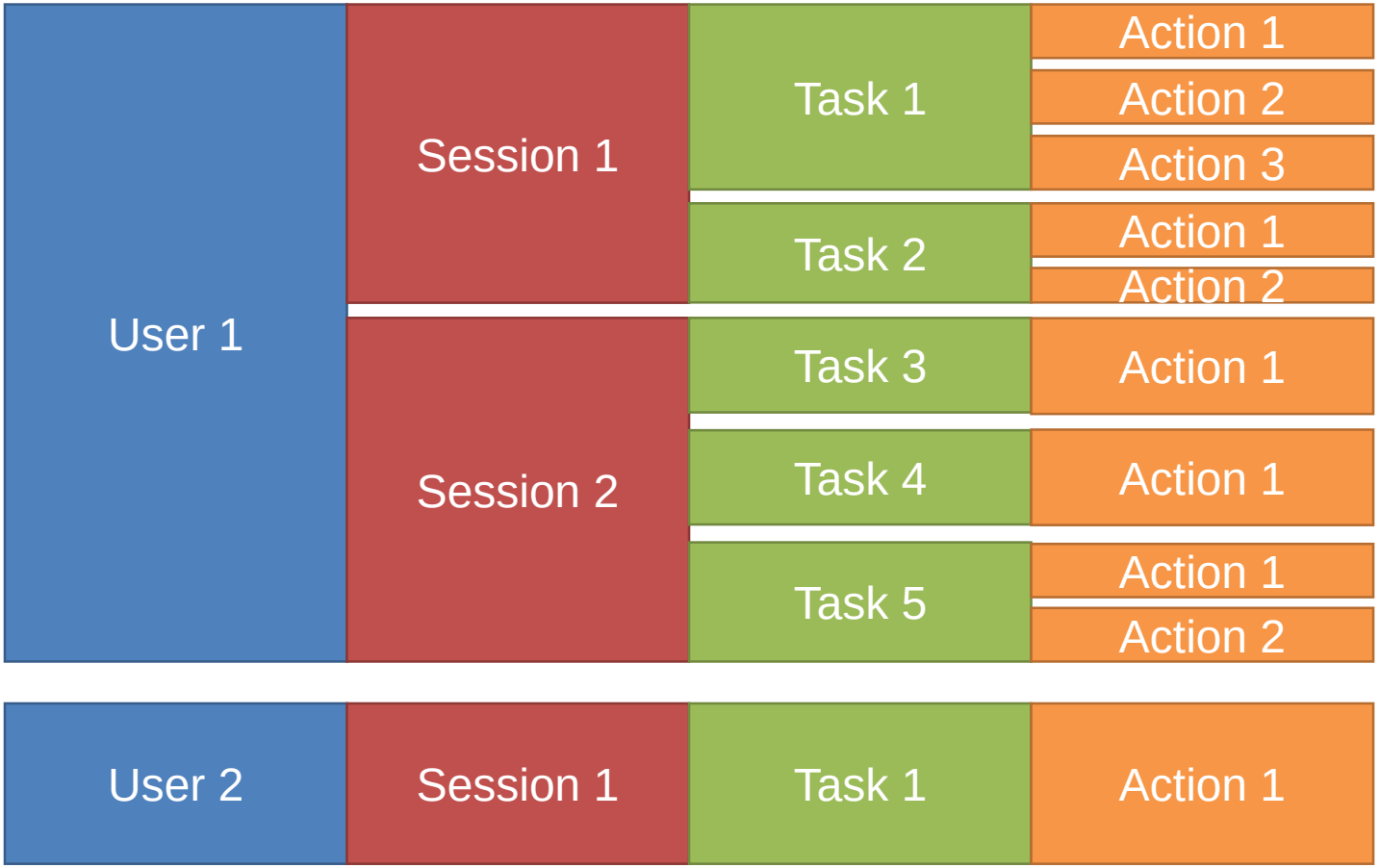
You will soon have gdiac accounts

- You will need to set your SFAM password

Four entities

Users	Sessions	Tasks	Actions
“players”	“pageloads”	“quests”	“actions”

The original idea



Four tables

Users	users
Sessions	player_pageload_log
Tasks	player_quest_log
Actions	player_action_log

Logging

- Painful bits are mostly taken care of for you
- Server communications managed through an Actionscript/Javascript library

Logging.swc

Constructor arguments:

- DEBUG_MODE
  - Turns off logging while you are debugging
- GAME_ID
  - Unique identifier for your game (given to you by me)
- VERSION_ID
  - Game version number

Recording

Users

Sessions

Tasks

Actions

recordPageLoad

recordLevelStart

recordLevelEnd

recordAction

Logging.swc

Four commands:

- recordPageLoad
  - use once when the player loads the game
- recordLevelStart
  - use when the player starts a level (or quest)
  - must follow ***recordPageLoad***
- recordLevelEnd
  - use when the player ends a level (or quest)
  - must follow ***recordPageLoad*** and ***recordLevelStart***
- recordAction
  - use when the player performs an action
  - must follow ***recordPageLoad*** and ***recordLevelStart***

Users and **Sessions**: recordPageLoad

High level idea:

- register new player or existing player
- make a new user (if unknown)

Users and **Sessions**: recordPageLoad

Arguments: none

Quests: recordLevelStart

High level idea:

- signal start of a task
- associate task with a user and session

Quests: recordLevelStart

Arguments:

- questId (integer)
  - Unique level identifier
- questDetail (string)
  - Any details about the level you want to record

Quests: recordLevelEnd

High level idea:

- signal end of a task

Quests: recordLevelEnd

Arguments: none

Actions: recordAction

High level idea:

- record an action
- associate it with user, session, and quest

Actions: recordAction

Arguments:

- actionId (integer)
  - Unique action identifier
- actionDetail (string)
  - Any details about the action you want to record

Pulling Data

- Large JSON object of everything
- CSV file of key metrics
- Direct database access

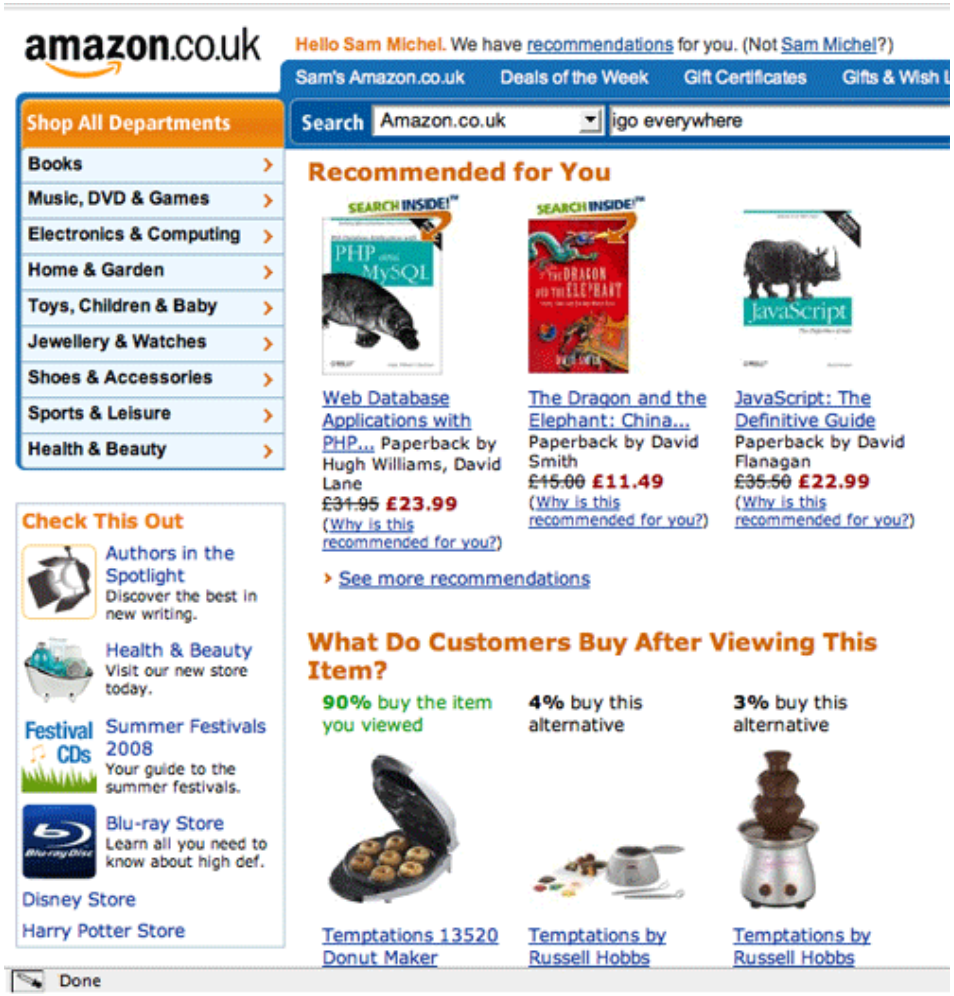
CSV data

Player ID	Levels Completed	Time Played	Returns
1	2	60	0
2	5	120	1
3	2	30	1

Test thoroughly!

- Very easy to get something wrong
- Only one chance for each release!

Data collection is everywhere…



…but so are ethical challenges

The Washington Post

Cornell ethics board did not pre-approve Facebook mood manipulation study

theguardian

Facebook fiasco: was Cornell's study of 'emotional contagion' an ethics breach?

PCWorld

Privacy group files FTC complaint over Facebook's 'emotional contagion' study

Milgram Experiment

Institutional Review Board

Cornell University
Office of Research Integrity and Assurance

IRB Approval

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Office of
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Institutional Review Board for Human Participants

Notice of Course Activity Approval

To:	Erik Andersen
Date:	September 05, 2014
Protocol ID#:	1408004901
Protocol Title:	CS-4154

The above referenced Course Activity Project was reviewed by Cornell's Human Research Protection Program (HRPP) and approved for the inclusion of human participants in class assignments. This approval does NOT cover students doing research for theses, dissertations, journal articles, public presentations, or the purpose of disseminating generalizable knowledge gained from the assignment. Such projects require the individual student to complete his or her own Initial Approval Request form before beginning recruitment and data collection.

You or your students must ensure that the welfare of the research participants is protected and that methods used and information provided to gain subject consent are appropriate to the activity. You and your students should familiarize yourself with and conduct the research in accordance with the ethical standards of the Belmont Report: http://www.hhs.gov/ohrp/humansubjects/guidance/belmont.html

Please give a photocopy of this approval notice to each student in your class who will be conducting a human participant research project. Acceptance of these terms by students constitutes an understanding that data collection (and allusions to conclusions drawn from these data) from the project(s) covered solely by this approval may never be used for theses, dissertations, articles, or public presentations.

If you have any questions, please contact the IRB office at irbhp@cornell.edu or 254-5162.

Don’t publish data

An Unbalanced Study of Unbalanc vers *balanced*

An honors thesis su l fulfillment of the requ of

lor of Sc

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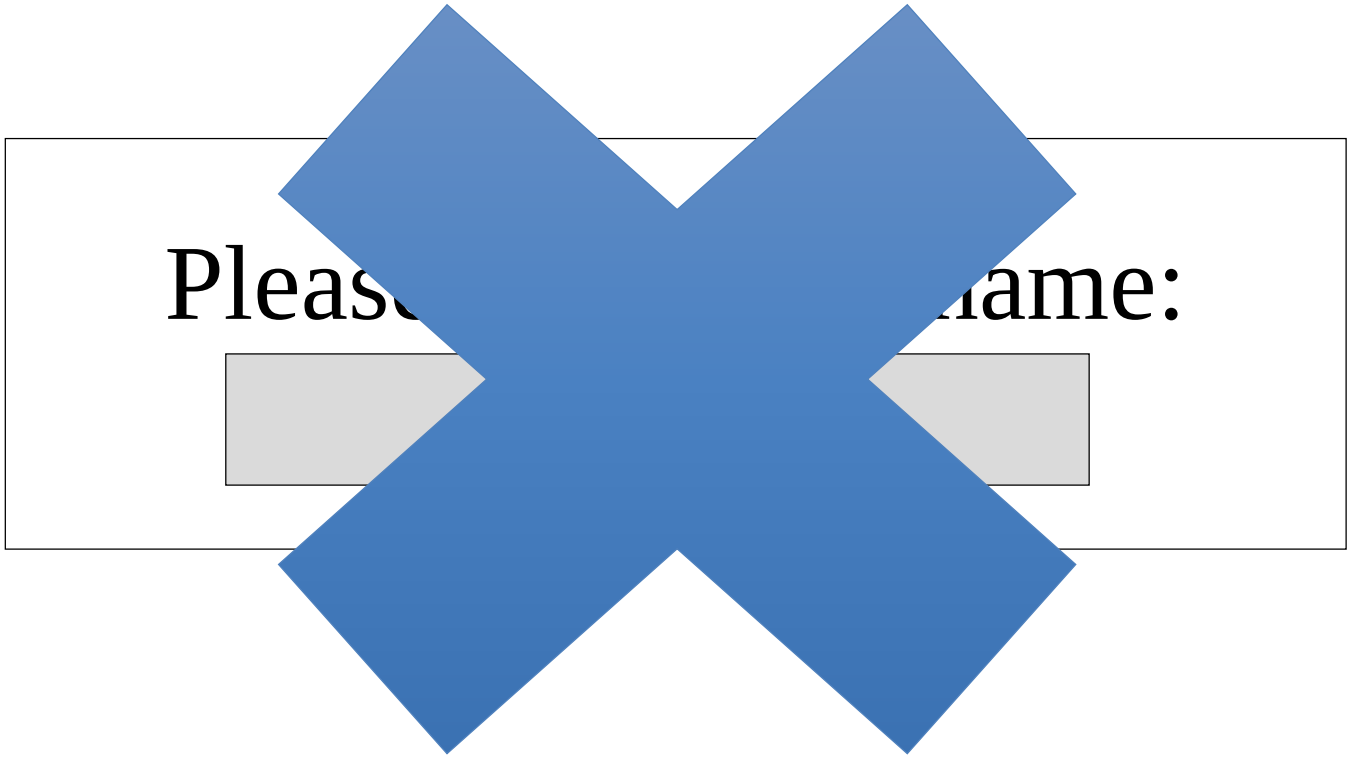
No identifiable data



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What this means for you

- Protect the welfare of your players
- Do not
  - record identifiable information
  - give data to anyone outside the class
  - discuss your data or analysis in
    - public presentations
    - theses
    - journal articles
    - conference papers

Group Activity

- Come up with a logging plan
  - What events are you going to record?
  - What information is associated with each event?
  - How will you test your setup?