WEEK 1: INTRODUCTION

98-186: Spring 2015 – Jordan Zink
Boulder Dash

- Wooden Out-and-Back Terrain Coaster
- Made by CCI in 2000; 4,725 feet long, 60mph
- PTC rolling stock (like most woodies)
- In 2012, #5 wooden coaster on Golden Ticket
  - #4 on Mitch Hawker
Boulder Dash – Wait, what...

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- Made by CCI in 2000; 4,725 feet long, 60mph
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- What does any of this mean / why does it matter?
98-186 will teach you

- About half of course covers backgrounds, such as
  - Where did coasters come from?
  - Who makes coasters?
- Other half of course covers design issues
  - How big should I make this turn?
  - How do I trick riders into thinking the coaster is taller / faster than it is?
- Plus some other topics here and there (e.g. Disney World)
 Bookmark course website (on syllabus)
 Attendance is taken / required
 5 assignments
   Video Watching
   1990 Coaster Design
   Identification Practice
   Designing with Newton
   Final Project
Jordan Zink – Senior in CS and Robotics
Have been passionate about coasters for 15 years
Been to 20+ amusement parks and ridden 139 coasters (95 steel, 44 wood)
Home park: Kings Island (Cincinnati, Ohio)
6th time teaching 98-186
Also CA 15-112 (7th time)
98-186 - Instructor
Coaster Basics
What are Roller Coasters?

- An amusement ride with a track shaped to subject riders to elements based on speed, forces, etc.
  - Basically, a twisted railroad
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What are Roller Coasters?

- They don’t need to be continuous circuits
  - Ones that aren’t are called shuttle coasters
What are Roller Coasters?

- They (technically) don’t even need to be gravity-driven
- These are powered coasters, but they’re lame
Basically Railroads

- Terminology derived from railroads

- Rail
- Track
- Car
- Train
- Spine
- Station
Two Types of Coasters

- Wood and Steel; based on rails
- Wood – Rails made of flat steel on layers of wood
- Steel – Rails made of tubular steel, I-beams, or anything that isn’t wood
Two Types of Coasters

- Only rails matter; supports don’t!

Steel supports, wooden coaster

Wooden supports, steel coaster
Two Types of Coasters - Differences

- Far more steel coasters than wood
- Steel can go higher and faster (more easily)
- Steel generally smoother
- Steel can go upside down, wooden can’t (sort of)
- Wood tends to have more wild ride experience
Coaster Stats

- Three main stats of interest: height, length, and speed
  - Also drop, but that’s usually unreliable
- Gives idea of size and intensity

<table>
<thead>
<tr>
<th>“Size”</th>
<th>Height</th>
<th>Length</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>&lt; 60ft</td>
<td>&lt; 2,500ft</td>
<td>&lt; 35mph</td>
</tr>
<tr>
<td>Medium / Normal</td>
<td>60ft – 150ft</td>
<td>2,500ft – 4,500ft</td>
<td>35mph – 65mph</td>
</tr>
<tr>
<td>Large</td>
<td>&gt; 150ft</td>
<td>&gt; 4,500ft</td>
<td>&gt; 65mph</td>
</tr>
</tbody>
</table>

*not concrete figures; just general references*

- Sorry metric users; coaster stats usually in imperial
Coaster Stats

- Other useful stats include
  - Inversions
  - Cost
  - Capacity
  - Duration
  - Max Vertical Angle
  - #Trains, Cars

- Use rcdb.com to get stats
Manufacturer vs. Designer

- When referring to coaster building
  - Designer – Plans out ride layout
  - Manufacturer – Takes layout and makes track and assembles coaster

- For wood, both tend to be done by same company
- For steel, separate companies (usually)
Manufacturer – Why Care?

- Knowing the manufacturer tells you lots about a coaster
  - Elements to expect
  - Feel of the layout
  - Wood or Steel
- Why 98-186 spends 2 weeks on manufacturers and a week on identification
Manufacturer — Example

- If an inverted coaster was made by:
  - Vekoma — Probably a SLC clone
  - B&M — B:TR clone or large, multi-inversion coaster
  - Sartori Rides International — Small, compact
More Terminology

Mid Course Brake Run (MCBR)

Lift Hill

First Drop

Brake Run
More Terminology

- Camelback – Hill with no turns
  - Bunny hill – Small hills (usually more than one
- Helix – Slopping turn (down or up)
  - Measured in degrees; ie “540 helix”
- Inversion – Going upside down
G-Forces

- Rides can be described as “forceful”; refers to G-Forces
- Accelerations felt by riders in curves and hills
- Can be felt in different directions
- Too little => boring ride; too much => too intense
- More on these in the Physics week
Safety

- Roller coasters are safe
- Far more likely to be injured driving to an amusement park than at the park
- Most accidents involve
  - Those with preexisting conditions
  - Maintenance workers
  - People being stupid
- Still, public freaks when something happens
Coaster Types

(beyond Wood and Steel)
Types – By Layout

- Out and back (e.g. right)
- Twister (e.g. below)
  - Both mostly for woodies
Types – By Train

- Sit-Down – “Normal”
- Spinning – Spins on vertical G’s axis (like a top)
Types – By Train

- Stand-Up
- Floorless
Types – By Train

- Track is above
  - Suspended – Cars swing
  - Inverted – Cars locked
Types – By Train

- **Flying** – Riders lie down, track above or below
Types – By Train

- Track on side
  - Wing – Cars locked
  - 4th Dimension – Cars rotate (freely or directed)
Types – By Track

- Racing – Two tracks side-by-side
- Dueling – Two tracks that interact
Types – By Track

- Mine Train – Steel track, wood supports, themed trains, multiple lift hills
- Wild Mouse – Lots of sharp turns and drops
Types – By Track

- Bobsled – Track is a trough; trains not locked
Coasters in the World

*coaster count figures from rcdb.com, taken August 21st, 2013
attendance figures from Themed Entertainment Association’s Global Attendance 2012 Report
How Many

- ~3200 roller coasters operating today worldwide
  - Only 175 wooden coasters! (5% of coasters)
- Vast majority (88%) are “normal” steel sit-down coasters
- Around 1/3 (maybe more) are kiddie coasters

By the numbers, this is rare and this is common
More blue means more coasters; red means none
Amusement Parks

- ~2000 amusement parks (hard to measure)
- Top 25 Parks (by attendance)
Amusement Parks

- Top 20 (by attendance) in North America

- 3 parks elsewhere in the U.S.A.
- 6 parks in California
- 8 parks in Florida
- 1 park in Canada
- 2 parks in Ohio
Amusement Parks

- Parks in places like SoCal and Florida are year round, whereas in most places they are seasonal.
Roller Coaster Videos
Roller Coaster Videos

- Be careful what conclusions you draw from them
- Try not to determine roughness from them
- Look at how fast it takes things
- Get “feeling” of the coaster
Incorrect Way to Film

**WHAT??**
I can't hear you, there's some damn noisy people here.
Correct Way to Film
Next Week

Origins of Roller Coasters
Photo Credits

- http://aka-img-2.h-img.com/media/img/b/hn/2475423/6976707786902662808.400_600r
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- http://images2.wikia.nocookie.net/__cb20100908154813/coasterpedia/images/d/d7/RiddlerStandUp.j pg
- http://rcdb.com/5.htm?p=13875
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