Box2D Final Version

Group 21 - Vulcans!

October 29, 2014

1 Introduction

This is our Box 2D Project Report for the complete project - Making a Rube Goldberg Machine. The link to the webpage of our project is (Insert link here)

2 Contents

Contents of this document include -

- Introduction
- Contents
- Honor code
- Original Schematic of our Rube Goldberg machine and Final implementation of our Rube Goldberg machine.
- Sequence of events in the simulation
- Explanation of each component in detail
  - Newton's Pendulum
  - Dominos
  - And many more..
- Techniques (Introduced in this course) Used
- Physical concepts used

- Implementation Plan/Sequence
- Task Distribution
- Challenging Aspects
- References

3 Honor Code

We pledge on our honour that we have not given or received any unauthorized assistance in this assignment or any previous task.

4 Schematic

Original schematic is as follows
(Insert original Inkscape image here)
After deeply considering various inputs that we got from our Instructor, TAs and the graders, we added several new components to our original design and a screenshot of our final machine is -
(Insert current image here)

5 Components Used

Moving -

1. Newton's Pendulum
2. Dominos
3. Moving Planks (Kickers?)
4. Balls
5. Conveyor Belt
6. Pulley

7. Cannons
8. Explosions

Static -

1. Splitting chain of events into two
2. Slide
3. Planks

6 Technical tools used in making this project (and its documentation)

- Box2D
- Latex, Bibtex
- Git - Source Code Versioning
- Doxygen
- Makefiles
- Code Profiling and Optimization
- Inkscape
- HTML, CSS
- Gnuplot

7 Physical Aspects of the elements in the project

- Pendulum
- Coefficient of Restitution
- Friction
- Energy Conservation
- Rolling of Spheres
- Projectile Motion

8 Implementation Plan

- Phase 1: We will start from the bottom up first implementing the bottom-most pendulum and dominoes.
- Phase 2: The staggered Dominoes will be added along with the towers on which they stand.
- Phase 3: The platforms will be added along with the hinged elements. Testing
- Phase 4: Balls will be added on to the platforms
- Phase 5: Pulley system will be created along with the platform guides for the final big ball.
- Phase 6: The final Balls will be added.
- Phase 7: Testing of the whole along with optimization to improve the toppling effect, and or some minor design changes to achieve some more dramatic destruction.

9 Task Distribution

1. Anand Dhoot - Phase 3,6
2. Maulik Shah - Phase 1,4
3. Anchit Gupta - Phase 2,5

10 Challenging Aspects

- Conveyor Belt
- Explosions
- Cannon-balls meeting at the same point in the air
- Precise positioning of all elements and testing

11 References