

BOX2D PROJECT REPORT

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Percentage contribution:

Group name: Tri/ode

Rana Prathap(140050068) : part of code, part of report, part of webpage, git, presentationslides,(100 percent)

Sreenivas(140050078) :part of code, documentation,part of makefile, part of webpage, git,(100 percent)

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Original project idea:

- A simple Rube Goldberg machine consisting of various elements including conveyor belt, double pulley.It starts with some simulation of various elements and finally a ball hits the bowling pin .The project was dsinged as shown below

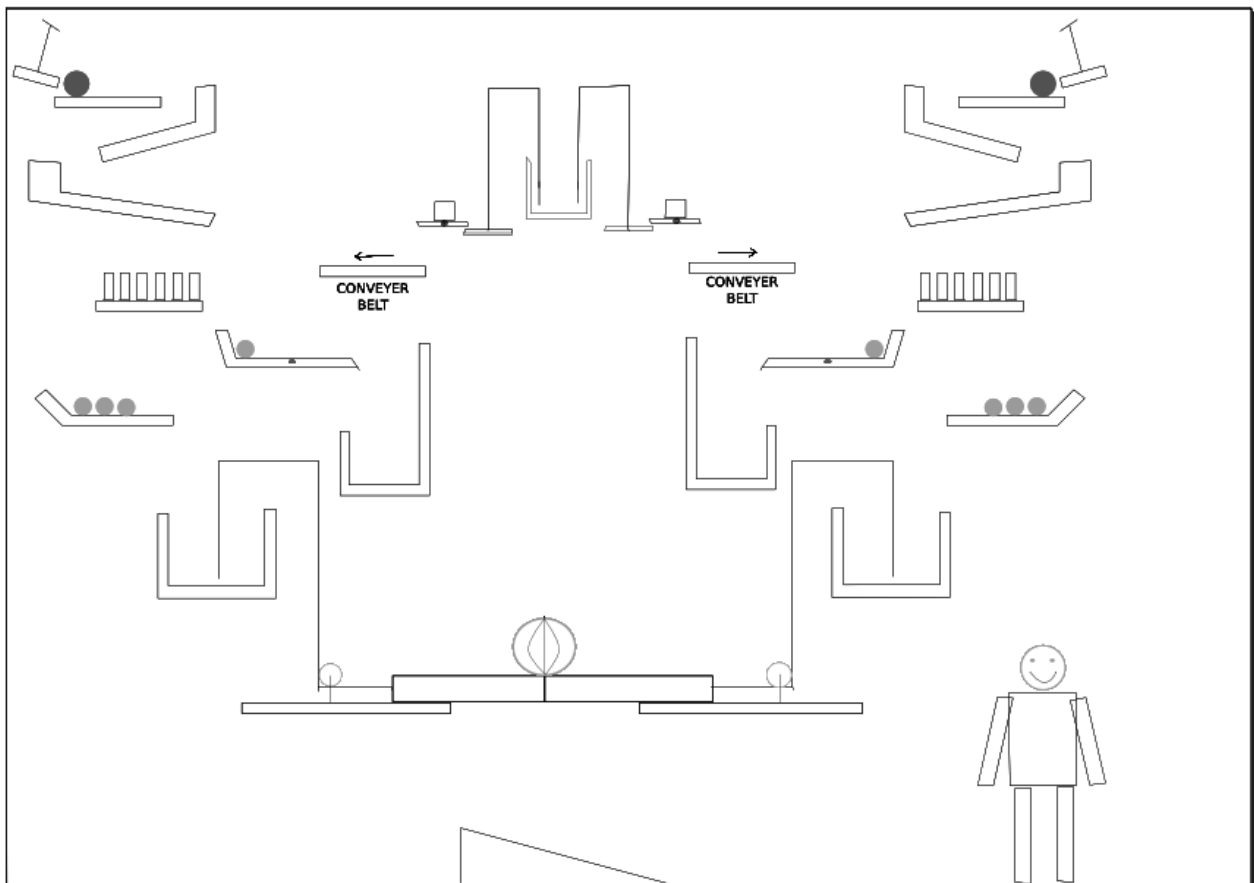


Figure 1: Original idea

What has been implemented:

- Our final project is almost similar to original idea with very little deviations, it is shown below.

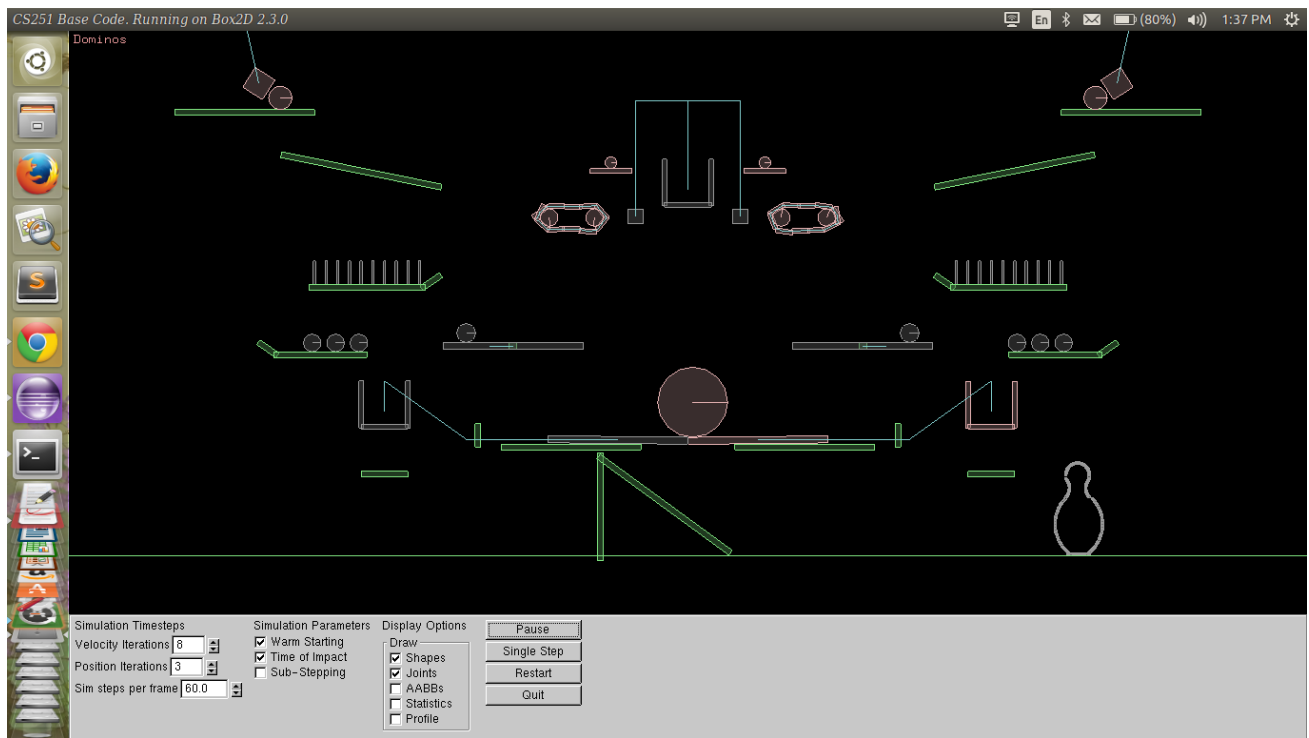


Figure 2: Final Project

Some thoughts of deviation:

- We did not deviate much from our original idea. We thought to add an elastic structure which could throw the large ball towards the bowling pin. instead of the wedge even it was not part of our original idea, we faced difficulties there so we stuck to our original idea.
- We removed the two tray like structures in middle as it didnt look good. We changed our project name to BOWLING MACHINE and put a bowling pin instead of the boy.

Difficulties faced and how we overcame:

- We tried implementing the conveyor belt using tangent speed to surfaces in contact, we have to change presolve function .[4]
- There were many things to be changed in other files also and left that idea as we always faced a lot of errors. and finally thought to implement via revolute joints.
- We tried to make conveyor belt look smooth, so adjusted box widths accordingly ,many weird things happened but we finally made it.
- We maintained the system perfectly symmetric even then, both the balls from conveyor belt did not fall at same pace on the dominos.
- Tried to put three pulleys ,but unable to set three anchor points ,so changed the function so as to accept three arguments but it led to lot of errors so finally restricted to two anchor points
- In making the bowling pin we searched for creating arcs in box2d but did not find any so implemented it using iteration.
- Thought to include rubber like thread and searched for it ,finally made but not used in our project [2]
- Thought to implement mouse drag using mouse joint from box2d manual, later found it not that useful.[3]

Useful techniques of lab:

- Git : It was most useful for transferring our files to each other and maintain a version control system
- diff : We used diff to check the differences in left and right parts as simulation is symmetric about vertical axis, we have to maintain the positions symmetric
- Html : We used all things learnt in lab about html ,css in the project webpage, and also adding video to html learnt from one of inlabs
- Makefiles : used to make our own makefile of this project
- Latex and Beamer : of course used to make this project report and the presentation

Some stages of our project:

- below shown figures are at some stages of our project

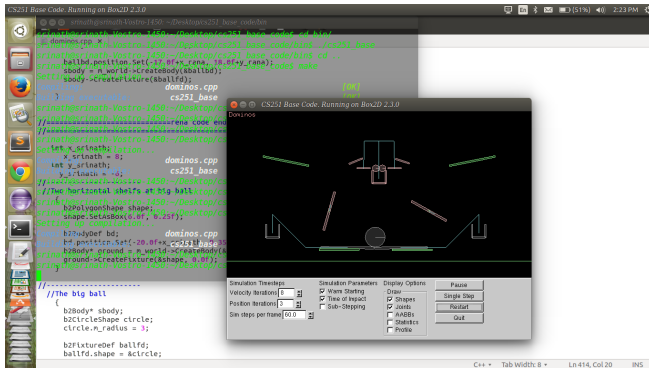


Figure 3: Just started

- Later suffered with conveyor belt and the dominos and it looks as..

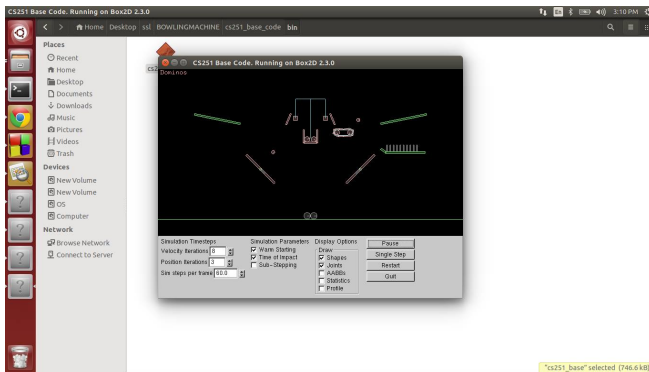


Figure 4: Fixing conveyor belt

- Finally united the objects and got our prefinal project..

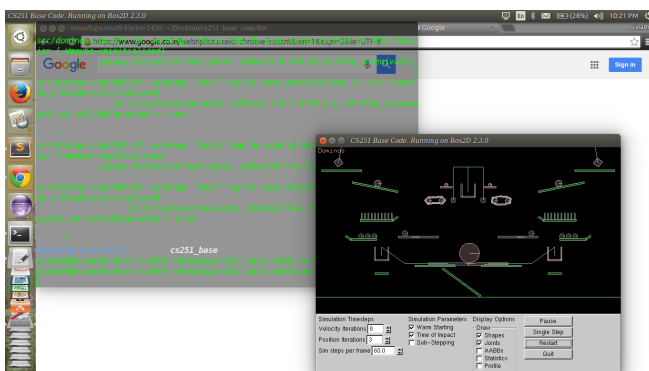


Figure 5: almost done

Profiling Data:

- The call graph our final project code in is shown here
- The call graph for release mode of final project is also shown
- The call graph of original cs251 base code is below



Figure 6: Final call graph

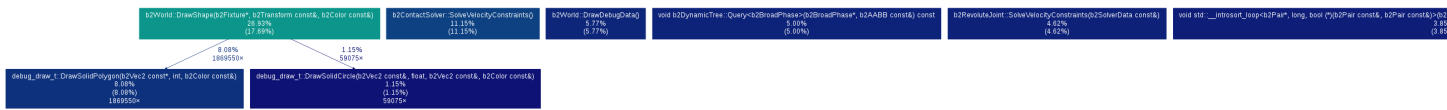


Figure 7: Final call graph release mode

- The top functions in original base code are b2world::DrawShape(b2Fixture, b2Transform, b2color const) about 13 percent, DrawSolidCircle(b2vect2 const, float, b2vect2 const, b2color const) about 9.7 percent
- The top functions in our code are Operator(b2vect, b2vect2 const) about 8 percent, b2vect2::b2vect2(float, float) about 6.4 percent
- The differences are probably because of increased fixtures(bars) and pulleys in our code than that of original base code

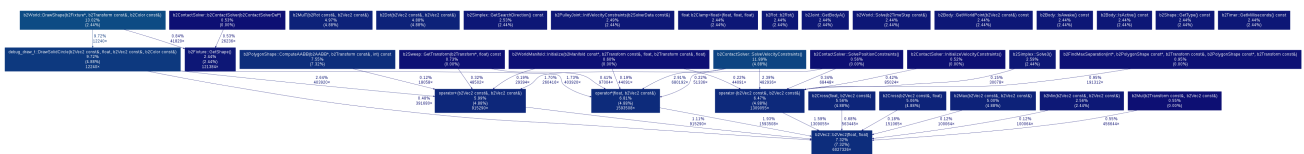


Figure 8: Final 251base call graph

Sources used:

- Some of the tutorials from this site [1]
- Many other sources are mentioned in the references list

Honour code:

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

REFERENCES

- [1] <http://blog.allanbishop.com/box2d-2-1a-tutorial-part-1>. web resource.
- [2] <http://stackoverflow.com/questions/9192672/how-to-create-a-rubber-thread-in-box2d>. web resource.
- [3] http://www.box2d.org/manual.html#_Toc258082974. web resource.
- [4] http://www.iforce2d.net/src/iforce2d_Conveyors.h. web resource.