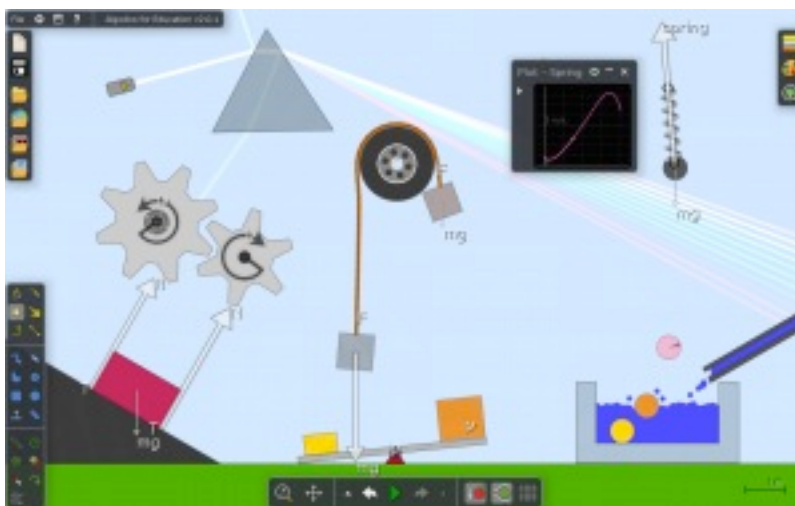


Algodoo Project

About Algodoo

Algodoo is a physics simulator that is available for free from Algorix Simulation AB. It is incredibly versatile and powerful while remaining playful and easy to use. After a few minutes of tutorials, you'll be amazed at what you can create. Check out algodoo.com for more details on the software. Keep reading this manual for more details about this assignment.



The Assignment

The requirements of this project are very loose. **The goal is for you (or you and one partner in your lab section) to create a project in Algodoo that explores some topic or topics that you have studied this semester in your Intro Physics course.** This is a chance for you to show off your creativity and really impress your TA. We want to give you an opportunity to focus on the aspects of introductory physics that you find especially appealing. During the last lab meeting of the semester, you will present your project to your TA and a small group of other students and turn in a short report. If you create the project on your own, you will write your report on your own and present your project on your own. If you create your project with a partner, you will write a single report as a team and present the project together.

The Presentation

The presentation will be short (5-6 minutes) and informal. You will present your project to your TA and about one-third of your lab section. This is not a PowerPoint presentation. **The goal of the presentation is simply to show off how your project works and what it does.** This presentation might be as simple as pressing the play button and saying a few words as you watch your simulation move forward in time. If your project requires more interaction from the user, you would want to demonstrate exactly what the user has to do. If your project is a game, you might consider teaching your TA the rules and having a

face-off. Hopefully, you have created a project that you'd like to brag about. Think of the presentation as your chance to brag to your TA and your classmates. Your TA will also ask you at least one question concerning the implementation of your simulation or the physics topics you address.

You will give your presentation during your last lab meeting of the semester. This lab period will be cut into three roughly one-hour blocks. You will have to attend one of these one-hour blocks at which you will give your presentation and watch fellow students present their projects.

The Report

Just like the presentation, the report will be short (less than 2 pages) and informal. It will consist of three sections.

- 1. Objectives:** Begin by telling your TA what topics from this semester of introductory physics are explored in your project. This should be a well-written sentence or paragraph, not a list. This paragraph should NOT include details about Algodo.
- 2. Implementation & Instructions:** This section is about how your objectives are met. Detail how you built your scene in Algodo. What objects are in the scene? What details about the objects are important? How do you model real-world objects? How do the objects move? How do they interact? Further, how does the user actually use the project? Your instructions should allow anyone with basic knowledge of Algodo to use and/or understand your project. You should detail any interaction required from the user. You should point out where the users should direct their attention. If your project is a game, make sure you include the rules here.
- 3. Observations & Conclusions:** You can really think of this as a reflection on your project. What did you learn as you made your project? Are there any limitations to your project that you wish you could have addressed? Did you have to make simplifying assumptions to create your project? Are there any parts of your project that you think are especially interesting or surprising? This should contain some discussion of physics and likely some discussion about Algodo.

Your project will be scored on the quality of the report, the quality of the presentation, and the creativity of the project according to the rubric at the end of this document. Note that you can only score 25 points for creativity. There are many ways that we use to quantify your creativity. You are not expected to address all of them. In fact, attempting to address all of the items in the creativity section will likely leave you with an ugly, overcomplicated project.

Plagiarism

It is very easy to find pre-made Algodo scenes online. In fact, there's something called *Algobox* on algodo.com that contains lots of projects. If you present someone else's Algodo scene in whole or in part as your own without giving proper credit, you are committing plagiarism. If your TA has reason to believe that such academic misconduct has occurred, the case will be investigated and potentially reported to the academic integrity officer of the School of Arts and Science.

Getting Help From TA's

Algodoo is installed on all of the computers in the physics labs. During the week before Thanksgiving, all or part of your lab section is designated as Algodoo Practice. In addition, there will be open sessions during the semester at which you may work on your project on the lab computers and get a little bit of help from TAs. The schedule for open lab sessions will be available on the Algodoo page of the lab website. You can also ask TA's about Algodoo during office hours.

Additional Details and FAQ

- **Algodoo software:** The software can be downloaded for free from algodoo.com. There's a link on the lab website.
- **Using the lab computers for this project:** Read the "Getting Help From TA's" section above.
- **Tutorials:** It is highly recommended that you run through the Crash Course tutorial and the Tools Tutorial. These teach you an incredible amount in a relatively short time.
- **Don't know what to do?:** If you are having trouble finding inspiration, you could try simulating a homework problem and perhaps extending it in some way. Or you could build a project that is a virtual version of an experiment you have done in lab this semester or a demo you saw in class.
- **Example projects:** There are several examples of projects ranging from great to not-so-great on the course website. Taking a close look might help you understand what we're looking for. You can always consult your TA if you have questions specific to your project.
- **How long should this take?:** Since the requirements of this project are very loose, it's hard to say exactly how long you should expect to work on it. The examples posted on the website took between 3 and 6 hours to produce, starting from scratch and no prior knowledge of Algodoo. If you are attempting a very complicated project, it might take longer. One way to speed things up is to use your Algodoo Practice session wisely and/or to attend an open lab session so that you can get some help with the software.
- **Don't overextend yourself:** If you get frustrated, make sure you ask yourself whether you might be making things too complicated. Are you trying to build a car when a rectangle would do the job just as well? Look at the rubric. There are lots of ways to succeed in this project without building something that is unnecessarily complicated.
- **Algodoo has limitations:** Algodoo does not model the universe perfectly. Showing that you can identify where Algodoo simulations come up short could even be part of your project and/or report. Finding clever ways to work around the limitations of Algodoo can be very impressive. The point is that you shouldn't get discouraged by the imperfections of Algodoo. Embrace the challenges that they pose!

Rubric

	Possible	Score
Report	45	
Begins with a well-written sentence or paragraph stating the objective(s) of the project (i.e. the physics topics explored). All topics mentioned are actually covered in the project.	5	
The physics topics are deemed sufficiently advanced.	10	
The description of the objects in the scene is clear and complete.	5	
The description of how the objects move and interact is clear and complete.	5	
Instructions for using the project are clear and complete.	5	
The conclusion/reflection is well-written and communicates an enthusiasm about the completed project.	5	
The conclusion demonstrates a thorough understanding of the topics of physics being investigated in the project and (if applicable) an understanding of the issues involved with using Algodoo to perform a simulation.	10	
Presentation	30	
The presenter is prepared and enthusiastic, and the presentation is enjoyable.	10	
The presenter is able to answer questions about implementation of the simulation and/or the physics being investigated clearly and confidently.	15	
The presentation is completed in the allotted time.	5	
Creativity A student can earn no more than 25 points for creativity	25	
The project uses advanced objects such as gears, springs, ropes, chains, thrusters, and motors in order to meet the objectives of the project. (3 points per type of object, up to 6 points)	6	
Material Properties (density, mass, friction, restitution, attraction, etc) or velocity are modified in order to meet the objectives. The importance of these choices must be explained in the report. (3 points per important modification up to 6 points)	6	
Uses other advanced features of Algodoo not discussed in the Crash Course or Tools Tutorial (e.g. gravity, wind resistance, spongify, creating complicated combined objects) in order to meet the objectives.	3	
Visualizations like plots, tracers, velocity vectors, and force vectors (just to name a few) are used in such a way as to enhance the effectiveness of the project. Visualizations that do not help your project meet your objectives will not add to your grade.	6	
The report includes a focused, thorough, and clear discussion of modeling objects and/or interactions. (See the Collisions Lab for an introduction to modeling.) This is especially interesting if an object or interaction is modeled in a clever way.	8	
The report includes a focused, thorough, and clear discussion of the limitations of a particular model or models. (See the Collisions Lab for an introduction to limitations of models.)	8	
The project is visually appealing. (e.g. colors and textures beyond the default settings are used effectively; the zoom is chosen such that the project is easy to view; the Sketch Tool is used effectively.)	3	
The user can interact with the project in a fun or interesting way using one or more of the keyboard, mouse, and drag tool.	6	
Total	100	