INTEGRATIVE PROJECT IN COMPUTER SCIENCE AND MATHEMATIC

420-204-RE

PROJECT

DELIVERABLE-1-

Team

Karen Florian, Steven Lennox Dy, Darina Horescu

Team Name

Pluto

List of Program Courses and Concepts

Course	Concepts
Introduction to Programming	Simple programming concepts such as variable, classes, objects, etc.
Data Structures and Objects Oriented Programming	The principles of OOP such as inheritance, abstractions, polymorphism, and encapsulation and basic data structures like arrays and linked list.
Program Development in a Graph	Designing and implementing a graphical user interface application with JavaFx
Integrative Project in Computer Science and Math	Develop a scientific computer application

Project Idea

Team Name:	Pluto
Team Member's name and Project Idea 1:	Steven: Cannon Game
Team Member's name and Project Idea 2:	Karen: Waves Simulation (Wave/Interference/Slits)
Team Member's name and Project Idea 3:	Darina: Optics Simulation
Team Member's name and Project Idea 4:	N/A
Selected Project Ideas and why:	Waves Simulation (Interference, Slits, Diffraction): this concept has a lot more tasks to cover and to

	manipulate so that each member has a task to do.

Project Description

Our project will be a simulation of the main aspects of waves, learnt in the waves, optics and modern physics course. We plan on representing interference of waves, waves when dealing with slits and diffraction. To do this we will use the theory of these patterns and the formulas which give us accurate representation of these waves.

For each concept, the user will be able to choose their data for each wave variable such as the amplitude, the length of the slits, the frequency, and the wavelength which will affect the simulations. Therefore, the user will be able to see visually the connection of all of the different wave aspects and thus have a better understanding of waves.

In the simulation, the user has three choices that represent different aspects of waves such as interference, diffraction and slits. When one is chosen, there will be a button that starts the animation of the waves. The user also has also the ability to change the characteristics of the wave such as the number of slits, the frequency, the wavelength, the amplitude, etc. These modifications will be shown as spinners, buttons, sliders, etc. As waves come from different media, the user also has choices to change media, which also changes the animation of the wave. After the user inputs their data, the animation will be shown accordingly.

In this project, Java and JavaFx will be implemented. Regarding JavaFx, SceneBuilder will be mainly used to construct the windows of the simulations. The project is not overly complicated nor too easy, and the tasks will be evenly distributed to each members making it possible to finish it by the deadline. The animation will be the most difficult part to manipulate as it is not well studied. The setup and the settings for the simulation will be more easy to manipulate as it is more familiar.

Each member will work on a different wave concept. One will work on interference, the other on slits and the last one on diffraction. Each one will work on the simulation and the design of it according to their concept. At last, all simulations will be integrated in the application as the user will have the option to select the wave simulation they desire.