

# Computer Science Portfolio

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For more information about each project and to view code go to [lexy.pakzaban.com/coding](http://lexy.pakzaban.com/coding)

## Computer Science AP: Java      Grade 11

- **Loops Project**  
Two different programs: solving “The Monty Hall” problem and Brute Force Graphing  
*Learning Objective:* For loops and while loops.
- **BlackJack**  
A version of the game BlackJack.  
*Learning Objective:* Interacting classes
- **Parchessi**  
A version of the board game Parchessi.  
*Learning Objective:* Arrays
- **Favorite Names**  
A graph of popular baby names over the course of the 20th century.  
*Learning Objective:* ArrayLists
- **Image Management**  
Put filters on an image: invert, flip, blur, difference, lens and hyptonic.  
*Learning Objective:* ArrayLists
- **Fractals**  
Renders a Mandelbrot set, which the user can zoom in on.  
*Learning Objective:* Complex numbers
- **Maze Building**  
Builds and solves a maze.  
*Learning Objective:* Stacks, queues and 2-D arrays.
- **Recursion Project**  
Four different programs: Binary Search Trees, Minesweeper game, Hex Converter and Sierpinski Triangles.  
*Learning Objective:* Recursion
- **Sort Project**  
A visualizer that displays an array of numbers graphically and sorts them.  
*Learning Objective:* Sorting Algorithms: Bozo, Bubble, Selection, Insertion, Merge and Quick
- **Final Project**  
Two different programs: Hough Transforms (detects circles in an image) and K-Means (how clusters form).  
*Learning Objective:* Review of topics learned that semester.

## Introduction to CompSci: Server-Side Web Building      Grade 10

- **HTML Project**  
A website about myself and my interests.  
*Learning Objective:* HTML and CSS.  
*Website:* [http://34.226.198.135/Project\\_1\\_HTML/Content/home.html](http://34.226.198.135/Project_1_HTML/Content/home.html)
- **Mad Libs**  
A version of the popular word game, Mad Libs. The users can create their own story.  
*Learning Objective:* PHP and user input.  
*Website:* [http://34.226.198.135/MadLibs\\_Project/MadLibsQuestions.html](http://34.226.198.135/MadLibs_Project/MadLibsQuestions.html)
- **SQL Project**  
Add, edit or delete songs to a table.  
*Learning Objective:* Creating a web-based database.  
*Website:* <http://34.226.198.135/MySQLProject/Songs.php>
- **Final Project**  
A social media website where one can create a login and post about anything.  
*Learning Objective:* New accounts and logins.  
*Website:* <http://34.226.198.135/Final/Login.php>

## Introduction to CompSci: Processing      Grade 10

- **First Drawing Project**  
Draws snowy mountains.  
*Learning Objective:* Fill, stroke and shapes.
- **Loops Project**  
Draws four images of art that uses loops.  
*Learning Objective:* For loops
- **Emulating Noise**  
Perlin noise is used as a random number generator to produce a harmonic sequence of colors and shapes.  
*Learning Objective:* Perlin noise
- **Image Editor**  
Three different programs that edit images.  
*Learning Objective:* Color shifting, color inversion, grayscaling, brightness thresholding, image flipping and edge detection.
- **The Art of Letters**  
Three different programs that use text to create images.  
*Learning Objective:* Text, mouse events and Perlin noise.
- **Final Project**  
Six different programs that reflect the topics learned that semester.  
*Learning Objective:* Reviewing topics covered that semester.

## Introduction to CompSci: Python Grade 9

- **Collect 4 Game**  
A game similar to Chutes and Ladders.  
*Learning Objective:* Boolean statements, if statements, modules, and random numbers.
- **Mancala**  
A version of the ancient board game Mancala.  
*Learning Objective:* Lists, for loops and while loops.
- **Shrek Game**  
The player, Shrek, hits Lord Farquard with pies.  
*Learning Objective:* Mouse events, sound effects and displaying a game.
- **Pac Man**  
A version of the game Pac Man. The player, Pac Man, moves through the maze to avoid being eaten by the ghost.  
*Learning Objective:* Key events, sound effects, and collision.

## Self-Directed Projects: Java

- **Paint**  
I used JavaFX to create an art board that has brush and stamp tools with controllable weight, opacity and color.  
*Learning Objective:* JavaFX circle and path objects, color picker and sliders
- **Cardiod**  
A program that creates complex cardioid and mandala-like shapes by reflecting a ray off the perimeter of a circle.  
*Learning Objective:* JavaFX sliders, circle and line objects
- **Golden Ratio**  
Draws Fibonacci spirals.  
*Learning Objective:* JavaFX key events, mouse events, scaling and translation.
- **Mandelbrot Set**  
Draws the Mandelbrot set with a multi-colored halo and lets the user to zoom in.  
*Learning Objective:* Mandelbrot coordinates and JavaFX scaling.
- **Pong**  
A version of the classic Pong game with a ball and a paddle.  
*Learning Objective:* JavaFX animation, login, writing to and reading from files.
- **Angry Birds**  
A version of the Angry Birds game where a projectile is shot at a moving pig.  
*Learning Objective:* JavaFX animation timer and image views.