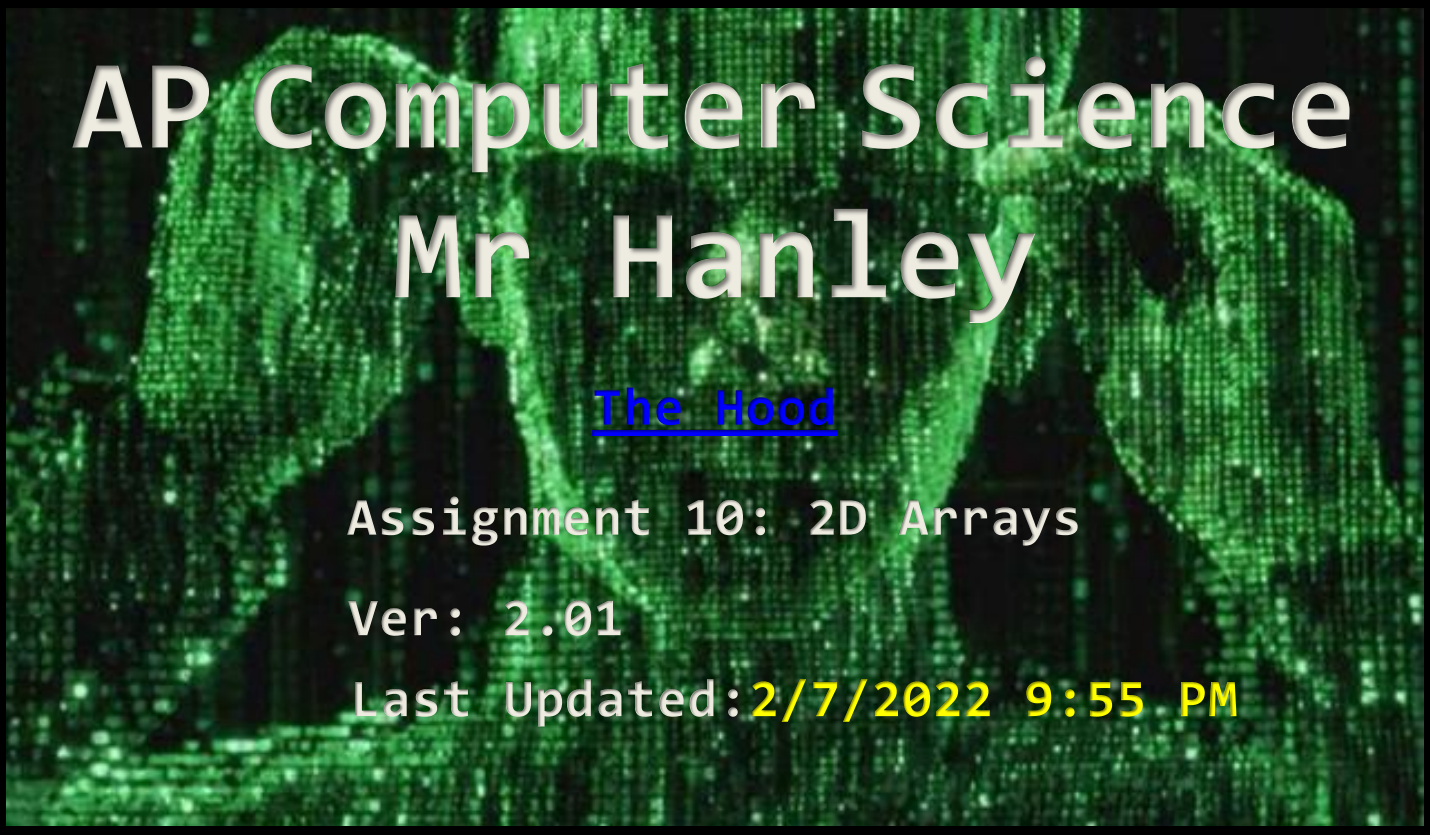
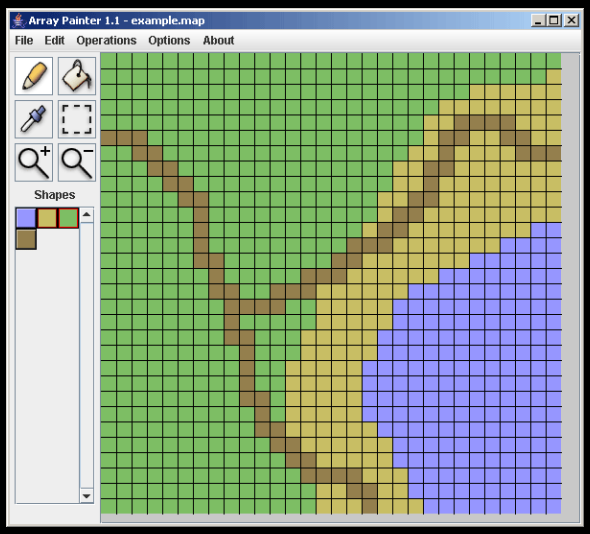




Assignment 10:2D Array Practice

Binary **Ones Comp** **Twos Comp**

Create a Project that uses a 2D array

Use a 2D array in a project in java.

Project can be console or GUI.

You need to use the Model-View-Controller Design pattern if you are using a GUI
This involves dedicating a java file to representing the information used in your program in a file called a model.

Make sure to create an instance of your model in your frame and use the methods of the model to control what is happening.

Ideas;

1. **Make a tile matching game.**
   Use a 2d array of integers, chars or strings. Scramble em up so the game is different each time.
   It can be one player or 2 player.
   If using a GUI, make sure there is a model that is in a separate file that the Frame makes an instance of.
   You can use colors or numbers or letters or images to present to the user.
   Minimum size: 4 X 4, as big as you want

   Model must be able to shuffle
   Model must be able to play additional games.
   MUST HAVE a scoring system. If two player, count the matches...if one player, try -5 for each miss and +20 for each match!!!!!!!

Project Name	**Assign 10 Matching Game**
Class 1 Name	MatchingModel
Class 2 Name	MatchingFrame

Rubric – Matching Game	
Randomly Scatters Pieces	**20**
Interface with user	**20**
Resets Game	**10**
Does Good Stuff – Game Logic	**30**
Scoring System	**20**
Comments	**10**
TOTAL	**110**

2. **Make a movie theater management system.**
   Create a program that allows a theater owner to schedule movies in their cinema.
   Allow for at least 6 theaters and 5 different times.
   Must keep tracking of movie name and rating
   Options must include;
   a. **Schedule a specific theater and time**
   b. **Schedule a theater for one movie all day**
   c. **Schedule a movie for every single time**
   d. **Clear out a theater**
   e. **Search for all movie times for a specific movie**
   f. **Search for all movies of a specific rating**

In order to accomplish this task, I would like you to define at least two different classes. The **Movie** class will represent an individual film. It must have at least 4 different variables; a title, mpaa rating, running time(int for minutes) and a quality rating (I use rotten tomatoes)

The **Theater or Cinema** class has a 2D array of Movie objects. It contains a variety of methods for manipulating the 2D array. A display method loops through the movies, for any null movie, simply print the

word <Empty>. For any non-null movie, print the title and mpaaRating. You can also print the rotten tomatoes or star rating if you wish.

I have found the command System.out.format("%-20s", movieDisplay); extremely helpful during this project. This means print to the console using a 20 character width and left justify the output. Left justified means push the String to the left of the 20 character field.

I also really like to have an option called autofill when I first start the program or from the menu. This uses an array of Movie objects. It randomly fills in the 2D array with pre built movies from the array. Remember to use a deep copy, not a shallow copy.

What the heck am I talking about? Use cinema[r][c] = new Movie(preload[x]);
That way you get your own memory when copying a movie, instead of just pointing to the same movie that is in the one d array.

Searching the 2d array for a target movie, should allow the user to type in a movie name and try to find the name in the 2D array. **Don't do any comparisons with null references, as this will cause an error.**
Print out a list of movies that fit the criteria and the time they are playing.

Searching by rating (mpaa or rotten tomatoes, you decide) should also print out a list of movies that fit the criteria and the time they are playing.

See the example on YouTube

Project Name	Assign 10 Movie Cinema
Class 1 Name	Movie
Class 2 Name	Cinema

Rubric – Movie Theater Manager	
Schedule a specific theater and time	10
Schedule a theater for one movie all day	10
Schedule a movie for every single time(same movie all time slots in a theater)	20
Display movies as a grid (summary info)	15
Ease of use	10
Clear out a theater	5
Search for all movie times for a specific movie	10
Search for all movies of a specific rating	10
Edit Details of Specific Movie	10
Comments	10
TOTAL	110

3. **Make a word search program**

   Allow the user to type in 10 words.
   Arrange them in a word search. Must have two diagonal left to right, two diagonal right to left. At least one vertical and one horizontal
   Every search must have at least 4 overlapping letters.
   Good luck, this drove Pat Millington nuts!!!!(And no one has tried it since)

Project Name	Assign 10 Word Search
Class 1 Name	WordSearchModel
Class 2 Name	Main

Rubric – Word Search	
Allows user to type in up from 10-15 words	10
Makes a 2D Array of chars or Strings for the wordsearch	10
Places words randomly	20
Must have two diagonal left to right	10
two diagonal right to left	10
one horizontal	10
At least one vertical	10
at least 4 overlapping letters	20
Comments	10
TOTAL	110

4. **Make the game Minesweeper**

   Make a **MinesweeperModel** and a **MineSweeperFrame**. The Model contains a 2d array which represents the board.

   Is it a good idea to have a tile class that stores whether or not the cell is showing or hidden and whether or not it has been flagged???

Project 1 Name	Assign 10 MineSweeper
Class 1 Name	Tile?
Class 2 Name	MineSweeperModel
Class 3 Name	MineSweeperFrame
Class 4 Name	MineSweeperApp

Rubric – Minesweeper	
Randomly places mines throughout a board(makes sure they are not on top of each other)	**20**
Reveals number of adjacent mines when clicking a square	**15**
Allows the user to flag a mine	**15**
Resets the board to a new level	**15**
Uncovers all adjacent 0 spaces	**15**
Has at least 3 levels	**10**
Has a timer to keep track of how many seconds elapsed	**5**
Works when two mines are right next to each other	**5**
Comments	**10**
TOTAL	**110**

5. **Make a 2 player battleship game**

   Allow each player to place their ships.
   Take shots at each others grid. Each hit garners an additional guess. Must report when individual ships are sunk. It would be neat to be able to create a grid class that is reusable for each player. Must be able to restart game.

   Your battleship game **MUST** have an auto place feature that places all ships for a player.

Project 1 Name	**Assign 10 BattelShip**
Class 1 Name	**Grid**
Class 2 Name	**BShipFrame**
Class 3 Name	**BShipApp**

Rubric – 2 Player Battleship	
Allow each player to place ships without overlapping	**20**
Bounds check each guess input	**10**
Keeps track and reports individual ship sinking	**15**
Uses an object oriented grid so code is NOT duplicated for BOTH PLAYERS	**15**
AutoFill Feature	**10**
Ends game properly	**15**
Coolness of interface	**5**
Allows game to reset	**10**
Comments	**10**
TOTAL	**110**

6. **Implement Columnar Encryption**

   See http://practicalcryptography.com/ciphers/columnar-transposition-cipher/

   Must be able to encrypt and decrypt.

   ONLY USE CAPITAL LETTERS

   Allow the user to enter in a keyword (no repeated letters) and a plain text.

   Encrypt the text and print out the cipher text.

Develop two different classes. **ColumnarEncrypter** and **EncryptTester.**
ColumnarEncrypter is an object oriented encryption class.
Its purpose is to accept a keyword from the EncryptTester and a phrase from the EncryptTester. It will use these to build a 2D array of letters, padded with a capital A or X. Print this matrix to the screen so we can examine it when you are encrypting and decrypting. Then show the cipher text or plain text.

EncryptTester provides the user with a menu like below
1. Encrypt
2. Decrypt
3. Quit
The tester should make an instance of the **ColumnarEncrypter** and should prompt the user for inputs. Then pass the inputs to the **ColumnarEncrypter** to do its thing. I need to see the intermediate array of characters. Print it to the console.

Then print the rearranged matrix to the screen
Then print out the cipher text or plain text

Project 1 Name	**Assign 10 Columnar Encryption**
Class 1 Name	ColumnarEncrypter
Class 2 Name	**EncryptTester**

Rubric – Columnar Encryption	
Allow the person to enter in a unique key no spaces, and only unique letters	**20**
Pads with X's or A's (upper case)	**10**

Transform the plain text into a cipher text accurately	**30**
Takes existing key and cipher text and converts back to plain text	**30**
Ease of Use	**10**
Comments	**10**
TOTAL	**110**

7. **Develop a Map Editor**

   Making a maze game can be time consuming.

   How nice would it be for someone to have an editor that lets them load up and edit symbols in a 2d maze and then save them to a disk file.

Project 1 Name	**Assign 10 Map Editor**
Class 1 Name	MainEditMainFrame
Class 2 Name	**Data File 1.txt**

Rubric – Map Editor	
Allows placing of at least 5 different symbols	**20**
Allows size variations from 10 X 10 -> 100 X 100	**30**
Correctly stores in file	**30**
Correctly loads from file	**20**
Comments	**10**
TOTAL	**110**

8. **Make a 2 player Checkers Game**

   Don't go here....This will consume hours and hours....Dylan Nezaj and

Andrew Schusterman (2019) went there and I think they actually work. Be sure to check up on the rules. If you can jump, you MUST!!! No need for an ai.

Rubric – Checkers	
Initial Setup	**20**
Allows movement (double jumps also)	**30**
Detects when jumps are possible and forces jump	**30**
Allows Kings to be anointed and move both ways	**20**
Comments	**10**
TOTAL	**110**

9. **Make a 2 player Reversi Game**

   This is difficult. It consumed Devin Jensen in the semester class. Best if you do, use a timer to show the pieces animate. That would be really cool. Sammy no Wammy Price also dove in (fall 2018).

   Sometimes at end of game you cannot make a move, make sure it knows and skips turn

Project Name	**Assign 10 Reversi or Othello**
Class 1 Name	ReversiModel
Class 2 **Name**	ReversiApp
Class 3 **Name**	ReversiFrame

Rubric – Reversi	
Flips pieces to appropriate color	20
Flips in multiple directions for one piece	20
Allows Scoring/Final Tally	20
Ends game properly	10
Coolness of interface	10
Allows game to reset	10
If no moves, allows player to skip turn	10
Comments	10
TOTAL	110

10. Make a Dungeons and Dragons Style Game

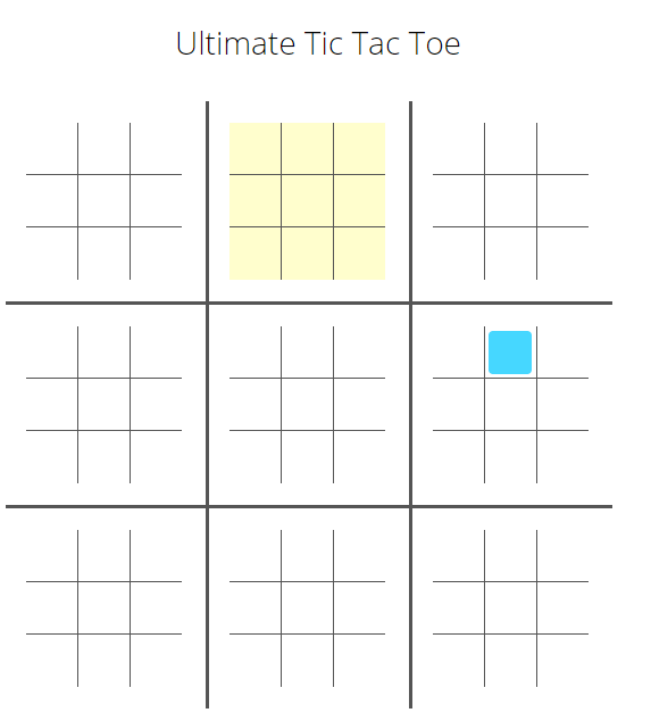
Allow a player to move around a maze and collect stuff. He or she must be able to fight against enemies and use at least two different weapons. The maze must be at least 40 X 40.

Project Name	**Assign 10 RPG**
Class 1 Name	MazeModel
Class 2 **Name**	MazeMain
Class 3 **Name**	Creature

Rubric – RPG	
Initial Setup	20
Prevents player from moving through walls	15
Collects items	15
Encounter logic (includes melee)	20
Fun Factor (how fun is your game?)	30
Comments	10
TOTAL	110

11. Ultimate Tic Tac Toe

The game of ultimate Tic Tac Toe is 9 games with one big game.



You will see the rules online....you might want to use a special JPanel which will allow you to paint graphics on top of the JPanel.....

Rubric – Ultimate Tic Tac Toe	
Initializes Board	20
Allows Player to Place an X or O in a square	15
Forces other player to put a X in appropriate board	20
Processes winning on smaller boards	10
Coolness of interface	10
Allows game to reset	10
Processes Ties on Big Board	10
Comments	10
TOTAL	110

Scale	
Matching Game	Normal
Movie Theater	+6
Word Search	+4
MineSweeper	+9
BattleShip	+8
Columnar Encryption	+6
Map Editor	+5
Checkers	+15
Reversi	+5
Maze Game	+10
Ultimate Tic Tac Toe	+7
GUI Bonus	+6


Artificial_Intelligence
Dynamic_Memory
Waterfall_Model
Nested_Loops
Stacks
Short_Circuit_Evaluation
Insertion_Sort
Binary_Search
Inheritance
Files
Linear_nlogn
Video_Games
Recursion
String
Search
File_Processing
Arrays
Selection_Sort
Big_O_Notation
Extreme_Programming
Client_Server
Hong_Kong_Fooey
2D_Arrays
Hangman
ArrayList