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MVC Yahtzee

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## Functional Overview

My project is a Model-View-Controller (MVC) design style game of Yahtzee. Using this design the view, a rudimentary level GUI, and the Model, a class that keeps track of and modifies, the score, the dice, and the players, only interact through a controller class. The first iteration of this project will have a console, text-based set up however since it is linked to model through the controller, if I have time I will attempt a Jpanel GUI view.

This program is designed to be user-friendly for the everyday person who wants to play Yahtzee.

## Design OvervieW

Describe your design - What will the program run like? What are the expected inputs? How will the user interact with the program?

The design will have a model class the uses a series of subclasses to track and alter the hands, dice, players, scorecards. These will all be altered based on commands and user input received through the controller from the view class. The view class will request user input through J Option Panes and then send that information through the controller to the model class.

## Design Details

This is a new design. Not only does it have a new kind of user interface, J Option Panes and potentially a Jpanel(if time allows), but it will have a new kind of interaction between objects, MVC. The pseudo code for the three main classes(model, view, and controller) is pasted at the bottom of the document.

## Testing

There are several places error could come into play that needs to be tested, as well there could be bugs that I might not think of that I need other users to help find them. Therefore, not only will I have a test plan of different scenarios I need to test, I will also have users such as friends, siblings, and classmates try out the game and see if they can find anything that will cause it to crash.

Test Plan

View Class tests

User input what should happen

Number of players set to 0 or lower game should not play

Number of players set above 6 game should not play

If score String isn’t valid game should prompt again

I will run the model class with a quick main tester program. It will create a model Object and call every method and print the results. To test the controller I can call these methods through the controller

Method what should print

Roll(5 booleans) when I print the rolled hand it should have a series of dice with random values between 1-6

setNumPlayers(int x) After setting the numPlayers the instance variable array of players should be full of nulls with the size x

endTurn The playerTracker should have advanced by one

SetScore(String name) when I print the ScoreCard it should have the score of the players hand in the spot adjacent to the name parameter, unless already full, then nothing should change, or if it is a scratch(nothing can technically score) there should be a zero in the place adjacent to the string in the ScoreCard array

getPossible if I print what this returns it should print an array of Strings of names of the scores

getScoreCard If I deepToString what this method returns I should see an array that is two columns of 13. Score name strings should be in the first column and integer score values in the second column

getWinner If I print what this returns I should get the number of the player with the highest total score(2nd column of the score card added up)

## Grading Rubric

Functional Specification-20 points

Does each have the necessary state and behavior?-9(3 for each of the MVC classes)

Do the classes work together as correctly?-5

Does the program work? Can a user actually use the program?-4

Is the program easy to use?-2

Design/Efficiency-10

Is the design thorough and readable?-5

Does the program eliminate redundancy where possible?-5

Documentation/Readability-7

Are all methods appropriately javadoc’d?-3

Is the code indented properly and easy to follow?-2

Are there extra comments in the code to explain any nuances?-2

Testing-3

Has the code been tested by people other than the creator?-1

Has the code been tested to make sure user input works correctly?-1

Has the code been tested to make sure it works according to the design?-1

## Proposed Implementation Schedule

Model and Constructor Classes implemented by 5/13

Testing of the two done by 5/15

The View Class implemented by 5/20(J Option Panes)

Testing of view and program done by 5/22

If all goes to plan an alternative view Class implemented by 5/26(JPanel)

Testing of new view and the whole program done by 5/28

Remember that your code review is on 5/28, presentations are after that.

## Potential Showstoppers

* I haven’t had a chance to finish the GUI chapter, and therefore I am not sure how difficult it is going to be to implement the view part of the program.
* I’m not entirely sure that the model and view will work together correctly. Therefore, if they don’t and I have to change parts of the program in order to make it work, that could take a lot of extra time.

## Open Questions

* How viable, time-wise, is it to make two view classes. Is it likely I will have time to learn JPanels and be able to implement a view with it? It seems like the model class, in my program, is more work, so is it actually plausible to be able to make two views since they are less code?

View Class

Instance Variables: Controller Object; int Turns\_Per\_Person;

Constructor

Initialize controller;

Set Turns\_Per\_Person equal to 13

Play Game

Show a J Option Panes with the game rules

Get Number of Players from User

If the number of players is greater than 0 and less than 7

Set Players in Controller

Create an int tracker to 0 for a while loop

While loop set to the Turns\_Per\_Person\*number of players

Call the player turn method

Call method seeScore

Call Controller method endTurn

Call getWinner method on Controller

Send message to the J Option Pane “Player “+num from getWinner+” WON!!!”

Turn

Create an array to track the dice for this turn

For loop from 1-3

If loop=1

Tell controller to roll the dice

else

Ask user which dice to roll(show them the dice)

Roll those dice through controller

Show them what they rolled

Boolean for if entered a valid place to score

While loop for Boolean=false

Call Score method

Send string returned to controller using controller setScore method

Set Boolean to whether or not the score went through(ie if valid)

Score

Boolean works=false;

Variable for string retrieved from user

While loop for works being false

Get the string from the user for where they want to score.

Print the options using the getPossible method (on Controller) and the data in that array

Works set to testScore(String gotten from user)

Return string retrieved from user

Private TestScore(String)

Using the getPossible method test the String parameter against the strings in the array

If it is there return true

Else return false

printScoreCard

print in J option pane the array you get when you call getScoreCard on the Controller

seeScore

ask the user if they want to see the their score card.

If yes

printScoreCard

Model Class (and helper classes)

Instance Variables: Array of Players; int PlayerTracker;

Constructor

Initialize PlayerTracker to 0;

Roll(5 booleans)

return roll method on Player

setNumPlayers(int x)

set the array of players to size x with x players

endTurn()

if player tracker=4

set player tracker to 0

else

increment player tracker

setScore(String for what they want to set it to)

call setScore method on the player in the array at playerTracker

getPossible

return getPossible method on player in array at playerTracker

getScoreCard

return getScoreCard on player in array at playerTracker

getWinner

int player=0;

int highest=0;

for loop for the size of array of players

int playerScore=getScore on player at index of array equal to loop index

if playerScore > highest

highest=playerScore

player=index of the highest player

return player+1

Hand Class

Instance Variables: Array of Dice

Constructor

Initialize array of dice to size 5 with 5 dice in it

Roll(5 booleans)

For loop of length five 0-4

Call the shuffle method on each dice in the array(Boolean)

Return new hand

getValueOfDie(int 0-4)

return getValueOfDie on die in array at index of int 0-4

addUp(int 1-6)

counter=0

for loop for 5

if getValue of the die at index in loop equals the param

counter++

return counter

Dice Class

Instance Variables: int currentValue; random Object

Constructor

Initialize currentValue to 1;

Initialize Random Object;

Roll(Boolean)

If Boolean= true

Use random object to get new number between 1-6

Set that number to currentValue

getValueOfDie

return CurrentValue;

Player Class

Instance Variables: Scorecard score; Hand hand

Constructor

Initialize Scorecard;

Initialize hand;

Roll(5 booleans)

call roll method on its hand

return the new hand

setScore(String, hand)

call the setScore method on the scorecard

getPossible

return getPossible In Score Card

getScore

int score

for loop for 13

sum the score card[index][2] set to score

return score

Score Card:

Instance Variables: array[][] of Objects(String and Integer); array of Strings(possible scores)

Constructor

Initialize array[]

Call method to set its strings

Use array[] to set and initialize first column of array[][]

SetScore(String, Hand)

Int location =Call findString(String)

Call calcScore(String,hand,location)

set array[location][2] to the returned value in calcScore

calcScore(String, Hand, location)

set variable value to 0

if(the array[location][2]=null)

if string passed in is “chance”

total the hand and set to value

if location is between 0-5

add up using value the number of location+1s in the dice in the hand

else

if the string passed in is “3 of a kind”

for loop for 6 iterations

use hand addUp method to see how many each number there are

if there are 3 or more of any

total the hand and set to value

if the string passed in is “4 of a kind”

do the same as 3 of a kind except if there are 4 or more

if the string passed in is “full house”

two Booleans one for 2 repetitions, one for 3 reps

for loop going to 6

use hand addUp method on each number if any has exactly 2

set Boolean to true

if any has exactly 3

set Boolean to true

if both Booleans are true

total the hand and set it to value

if the string passed in is “Yahtzee”

for loop for 6

use addUp method on each number

if any equal 5

set value to 50

if the string passed in is “small straight”

create a temporary array of size 5

the values equal to the currentValues of the dice in hand

use arrays.sort on the array

For loop for 3

if temp array at index=array at (index+1)-1 =array at(index+2)-2

total array and set it to value

if the string passed in is “large straight”

same as above except a for loop for 2

then check first 4 values in the if statement

total array and set it to value

returns value

Private FindString(String) returns index of String

For loop to go through array of Strings

If String = string at index of for loop in array

Return the index

getPossible

return the array of Strings

Controller Class

Instance Variable: Model Object

Constructor()

Initialize model Object

Roll(5 booleans)

return roll method on model

setNumPlayers(int x)

call this method on model

endTurn()

call this method on model

setScore(string)

call this method on model

getPossible()

return this method call on model

getScoreCard

return this method call on the model