CONCORDIA UNIVERSITY

DEPARTMENT OF
COMPUTER SCIENCE AND SOFTWARE
ENGINEERING

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RISK Game (Build-2)

Architectural Design

BY:

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Introduction

Develop a RISK game using Model View Controller (MVC) software design architecture with iterative development to deliver working modules in small builds. It was an effort to use extreme programming key features such as Pair programming, Collective ownership, Coding Standards and many more.

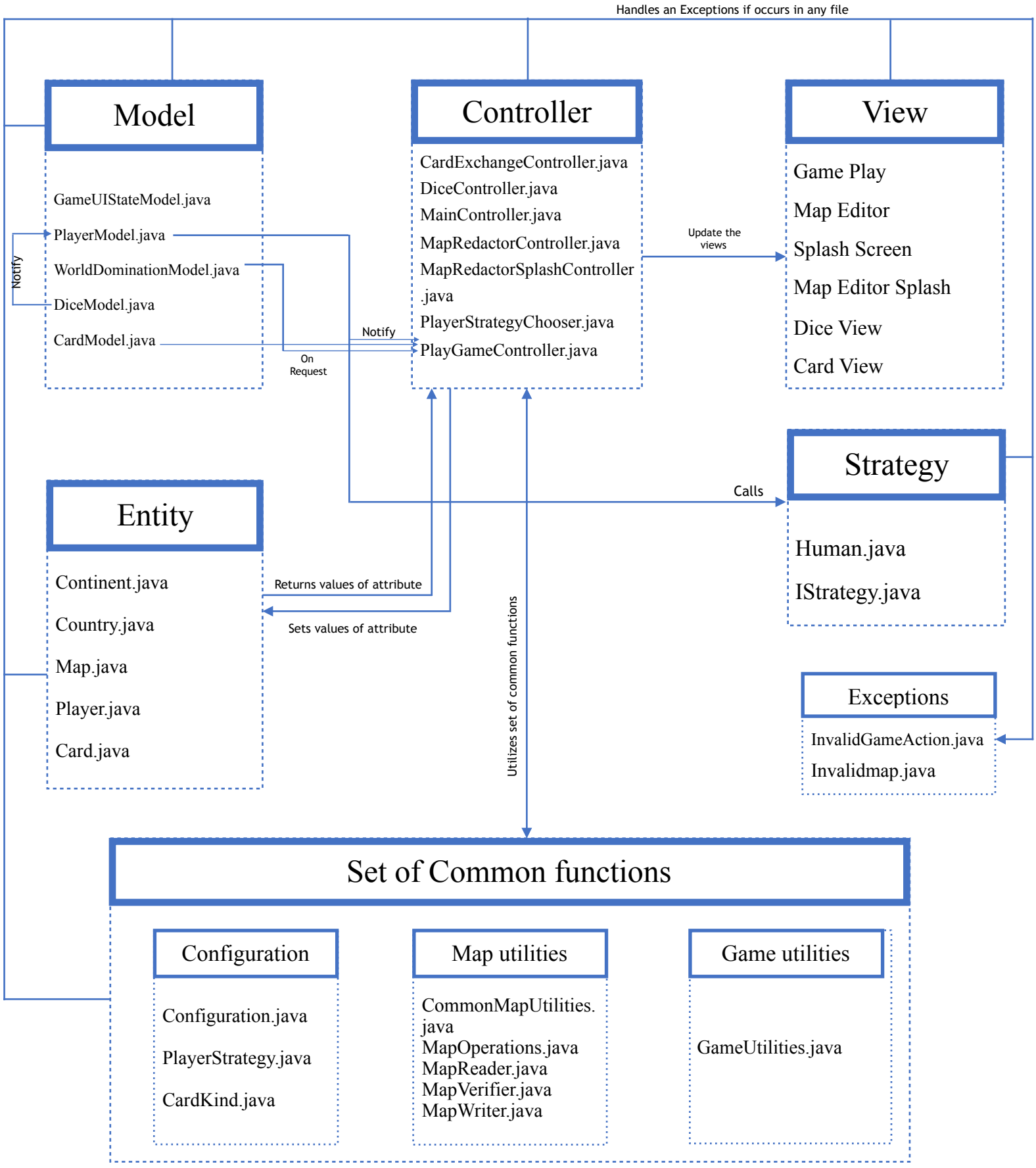
1.Scope

The scope of the build 1 is as per the instruction guidelines for the build:

- Map Editor:
    - Create a new map file
    - Edit an existing map file
    - Add/Update/Delete Continent , Country and Adjacent Country
    - Make sure that the integrity of the connected graph is maintained.

- Game Play:
    - Assigning country to player
    - Player can assign armies to each country in round robin manner
    - With proper calculation of armies, Reinforcement phase is implemented
    - With a valid fortification move, Fortification phase is implemented

2.Architecture Design



3.Modules Description

3.1.Controllers

File_Name	Description
PlayGameController.java	It is a mediator between the GameUtilities class and gameplay.fxml file. It captures all the user action like creation of player, assigning armies, all the three phases of the risk game etc.
MapRedactorController.java	It is a mediator between the MapOperations and the mapeditor.fxml. It captures all the user actions like add, update and delete continent or country or adjacent countries.
MapRedactorSplashController.java	It controls the user action from mapeditorsplash.fxml and calls new controller to open a pane of javafx.
MainController.java	This file handles the user action from main screen.
PlayerStrategyChooserController.java	It allows to choose a player Strategies for selected number of player (i.e Human or Computer)
CardExchangeController.java	This class is the controller for the card exchange view.
DiceExchangeController.java	This class is the controller for the dice view.

3.2.Entity

File Name	Description
Map.java	It contains all the information of the Map and a list of the continents.
Continent.java	It contains all the information of the continent and a list of all the countries that belong to a continent.
Country.java	It contains the information of the country like name, a reference to which continent the country belongs, list of all the adjacent country, count of armies currently residing on the country.
Player.java	It contains all information related to a player and the number of armies assigned to the player.
Card.java	It contains all the information regarding to Card.

3.3.Maputilities

File Name	Description
MapReader.java	It reads the map file format and parsing in to Map object and also checks for the validity of the data of the map file.
MapWriter.java	It is responsible for writing the Map object to the file.
CommonMapUtilities.java	Contains all the common method of the map like: saving map object, opening a dialogue box etc.
MapOperations.java	It perform operation like addition or update or deletation of country or continent.
MapVerifier.java	This class validates the map.

3.4 Configuration

File Name	Description
Configuration.java	It defines global constant variables and messages for the application
CardKind.java	Enumeration for defining 3 card types for the game.
PlayerStrategy.java	Enumeration for defining player strategies (Human).

3.5 Gameutilities

File Name	Description
Gameutilities.java	It handles the common operations for the game play phase.

3.6.Main

File_Name	Description
Main.java	Entry point for the application

3.7.Exception

File_Name	Description
InvalidMap.java	It manages exception of the map validation.
InvalidGameAction.java	It manages exception of the Gameplay phase.

3.8.Strategy

File_Name	Description
Human.java	It implements Human Strategy when player want to play manually.
IStrategy.java	This interface defines methods which are to be implemented by the strategies.

3.9 Model

File_Name	Description
PlayerModel.java	It handles operations of the players such as reinforce, fortification and many others.
WorldDominationModel.java	It provides the data for the chart to the PlayGameController.
GameUIStateModel.java	It stores the state of the button.
CardModel.java	This class handles the operation regarding card. This clsss notifies the PlayGameController if it is changed.
DiceModel.java	This class also notifies the PlayerModel if it is changed and handles the operation related to dice like rolling dice and comparing dice.

4.Test Cases (Junit) Description

Gameutilities	
File_Name	**Description**
GameUtilitiesTest.java	This is a test class for GameUtilities. i.e. one of its method tests the allocation of country to player is working or not.
GameUtilitiesTestSuite.java	

Main	
File_Name	**Description**
MainTestSuite.java	This is a test class for running all test suits. (MapUtilitiesTestSuite.class, GameUtilitiesTestSuite.class, ModelsTestSuite.class, StrategyTestSuite.class)

Maputilities	
File_Name	**Description**
MapOperationsTest.java	This is a test class for Map operations. i.e. one of its method tests the functionality to map a Country with the continent.
MapReaderTest.java	This is a test class for Map Reader. i.e. one of its method tests the map which has countries without continents.
MapVerifierTest.java	This is a test class for Map varifier. i.e. one of its method tests if the program can load unconnected continent map.
MapUtilitiesTestSuite.java	This is a test class for running all test suits in Maputilities i.e. (MapReaderTest.class, MapOperationsTest.class, MapVerifierTest.class)

Models	
File_Name	**Description**
PlayerModelTest.java	This is a test class for Player Model. i.e. one of its method tests the number of armies for different players etc.
DiceModelTest	
CardModelTest	
ModelsTestSuite.java	

Strategy	
File_Name	**Description**
ComputerTest.java	This is a test class for the strategy Computer. i.e. one of its method tests the normal functionality of the getRandomCountry method.
StrategyTestSuite.java	

5.Tools

Tools	Description
Eclipse	IDE for the game development
Scene Builder	It is an open source JavaFX system used for UI design and gives a skeleton of the events to be implemented in controller.
JavaFx	Library to control the UI component
Source Tree	It is Git code management System which gives one place to plan projects, collaborate on code, test and deploy.
Junit 4	Junit 4 for writing test cases
Maven	Maven as a build automation tool to manage all project dependencies.

6.Refactoring

No.	File	Description
1	PlayerModel.java	Applied substitute algorithm in which we have replaced logic of method[2] { we've used array of number_of_armies instead of switch case for assigning armies to the players. }
2	Human.java	Applied Extract method in which we've moved some part of the code to separate new method and replace that code with a call to the method.[2] { We've created new method for alertBox as it is used many times in a file by calling that method with parameters. }
3	PlayerModel.java PlayGameController.java	Removed textAreaMsg from the parameter of the tradeCardsAndGetArmy(…) method in player model - redundant parameter passing removed
4	PlayerStrategyChooserController.java	Applied Encapsulate Downcast refactoring in getStrategyObjectForThePlayer() method { IStrategy object is downcast to Human object}
5	Playermodel.java MapRedactorController.java	The name of a method does not reveal its purpose so, refactored it by changing it. { onClickContList -> onClickContinentList ; onClickCounList -> onClickCountryList ; assignarmiestocountry -> assignArmiesToCountry }

References :

1. Rules Followed : https://www.wikihow.com/Play-Risk
2. https://sourcemaking.com/refactoring/refactorings
3. https://www.sourcetreeapp.com