RISK

SOEN 6441 – Build 3

Advanced Programming Practices

By Dr. Joey Paquet

Team 21 :

Ashish Sharma (40050452)

Dhruv Gusain (40048029)

Navjot Kaur Bhamrah (40050459)

Kashyap Vedantam (40042347)

Architecture Design

INTRODUCTION

The Swing toolkit uses a modified MVC design pattern. It has a single UI object for both the view and the controller. This modified MVC is sometimes called a separable model architecture. The model is used for various kinds of buttons like push buttons, check boxes, radio boxes and for menu items.

INTERACTION

In the Swing toolkit, every component has its model, even the basic ones like buttons. There are two kinds of models in Swing toolkit:

- state models
- data models

The state models handle the state of the component. For example the model keeps track whether the component is selected or pressed. The data models handle data they work with.

Architecture Design

MODEL

Package – com.risk.model

- AttackPhaseModel
- ConfigureMapModel
- EditMapModel
- FortificationPhaseModel
- GameDriverModel
- ParseMapFileModel
- PlayerClass
- PlayerDominationModel
- ReinforcementPhaseModel
- ResourceManager
- SaveAndLoadGame
- SaveMapUponConfigModel
- SaveMapUponEditModel
- StartUpPhaseModel
- TournamentModeModel

Package – com.risk.behavior

- PlayerBehaviourInterface
- AggressiveBehaviorImpl
- BenevolantBehaviorImpl
- CheaterBehaviorImpl
- HumanBehaviorImpl
- RandomBehaviorImpl
- StrategyContext

UI AND CONTROLLER

Package – com.risk.ui

- CardExchangeUI
- ConfigureMapUI
- DeployArmiesUI
- EditMapUI
- FortificationUI
- GameModeUI
- MainMenuUI
- MapEditorMenuUI
- PhaseUI
- PlayerDominationView
- ReinforcementsUI
- SaveMapUponConfigUI
- SaveMapUponEditUI
- TournamentModeUI
- UploadMapUI

Design Patterns Used

1. Observer Pattern
   - The observer pattern is a software design pattern in which an object, called the subject or observable, maintains a list of its dependents, called observers, and notifies them automatically of any state changes, usually by calling one of their methods.
   - In the game, at multiple instances this pattern has been used.
   - JDK 1.0 defined Observer interface and Observable class have been used to achieve this design pattern in the project.
   - For example – PlayerClass.java is an Observable and its observers are PhaseUI and PlayerDominationView

2. Startegy Pattern
   - It is a behavioral software design pattern that enables selecting an algorithm at runtime.
   - The strategy pattern defines a family of algorithms, encapsulates each algorithm, and makes the algorithms interchangeable within that family.
   - In the project, the strategy pattern is used to switch to different behaviors as per the player whose turn comes up.
   - The different player behaviors implemented using the Strategy Patterns are aggressive, benevolent, cheater, random and human behaviors.

Coding Conventions

INTRODUCTION

Coding conventions are a set of prescriptive rules that pertain to how code is to be written, including:

Indentation: this depicts how the code has been arranged with proper syntax to maximize readability.

Comments: how to consistently and efficiently one uses comments to help program understandability.

Declarations: what syntax to use to declare variables, data structures, classes, etc. to maximize code readability.

Naming: this allows us to decide how to name the entities of a program so that it relates well with the project and increases understandability.

Coding Conventions

Why is it needed?

Coding Conventions play a very important role in development. Though they improve the internal quality of the code rather than affecting any external visible quality.

In general, having proper or fixed coding conventions allows to:

- **Maximize the productivity**
- **Increasing readability**
- **Maximizing understandability**
- **Increasing the sustainability of the development**

Coding Conventions

Coding Conventions and Standards adopted in project

1. **Code Layout**

- Approach used - Maximize visibility of the different blocks by having curly braces alone on their line of code.
- Blank lines have been introduced in between the code, to increase the readability.

2. **Naming Conventions**

- **Constants** have been names with upper case including underscores as separators.
- **Classes** have been named as per the architecture adopted and under the package.
- All class names start with upper case letter and words are separated using case change.
- The variables used are named per their scope.
- **Methods** name start with lower case and are followed by parentheses. **Camel case** is followed.
- Attributes start with lower case and are separated with underscores.
- Local variables are entirely lower case without underscore.

Coding Conventions

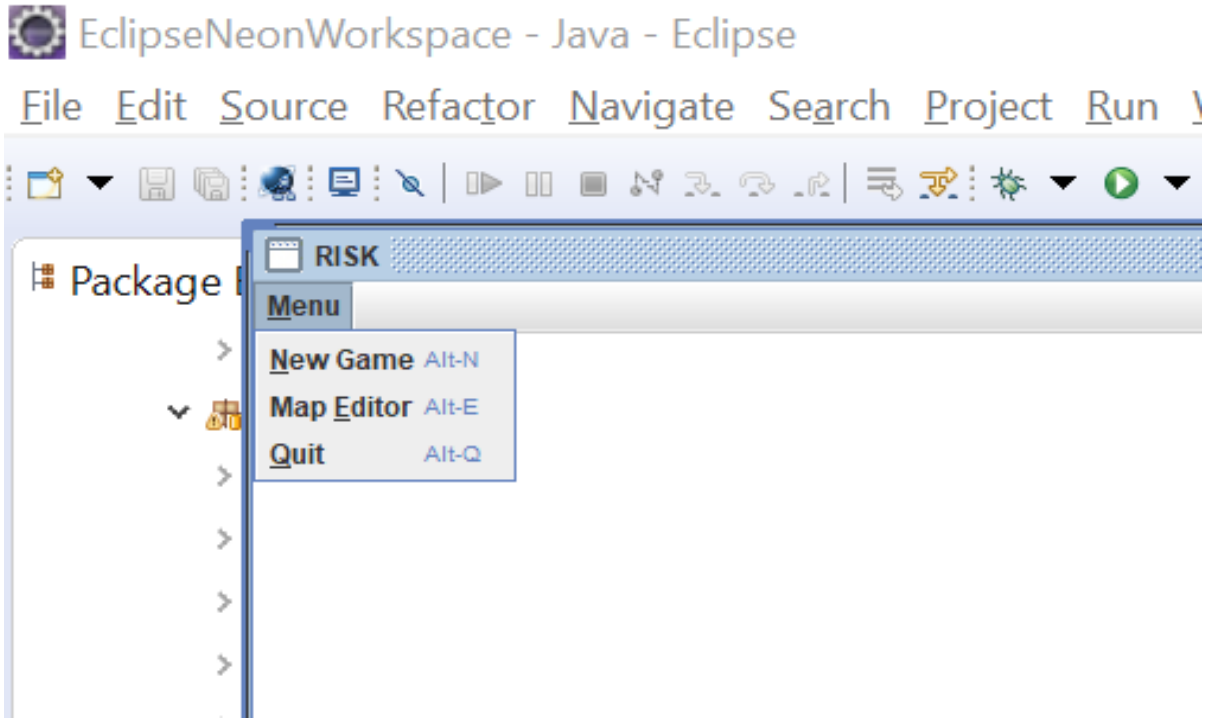
3. Comments

- Commenting is done as per conventions for JavaDoc.
- The purpose is stated at the beginning of every class or file.
- Each method has comments explaining its function as well as parameter and return type.
- Each class variable has comments above it explaining its purpose.

4. Indentation

- The code has been indented as per standards to improve code readability.

Screenshots

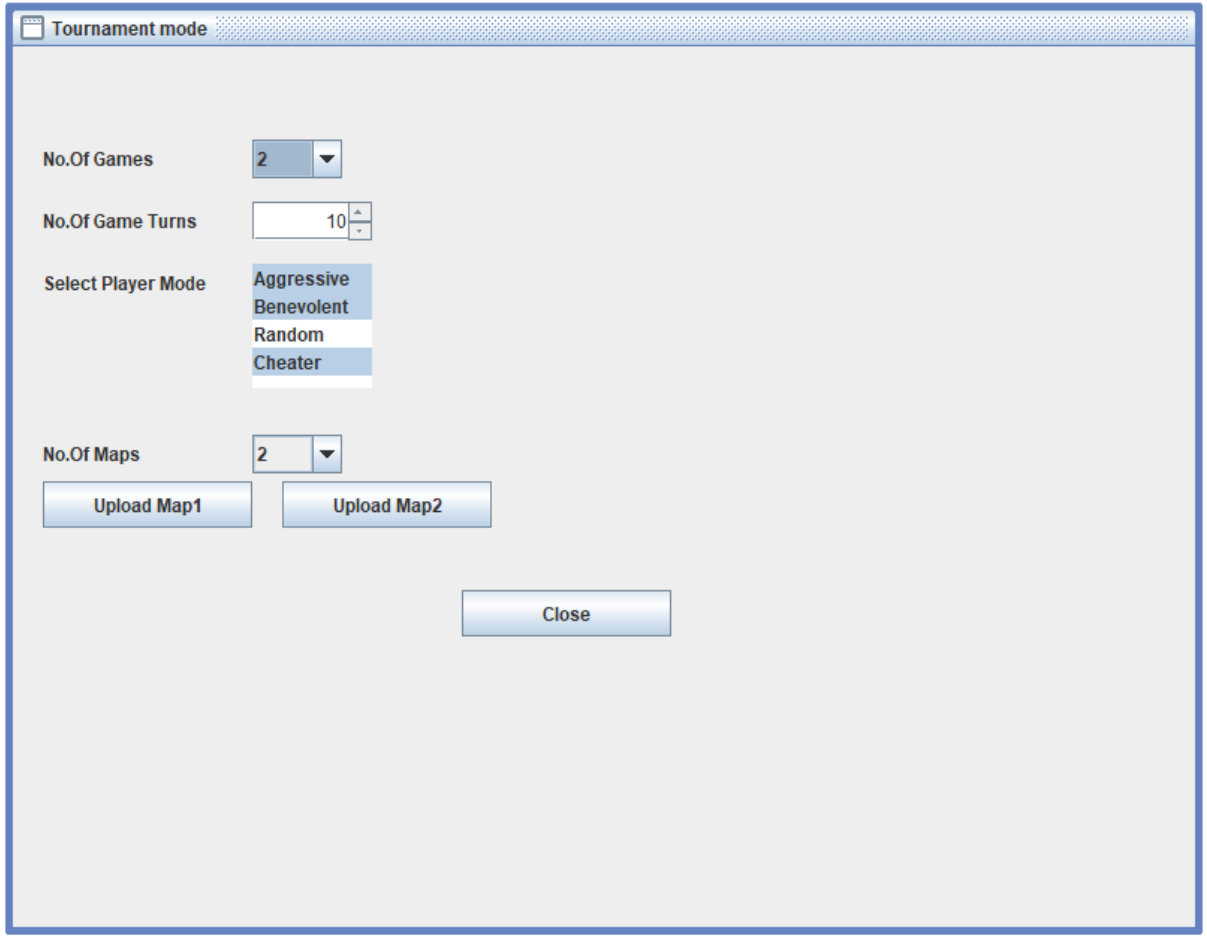


RISK Menu Options

Screenshots

Game Modes

Screenshots



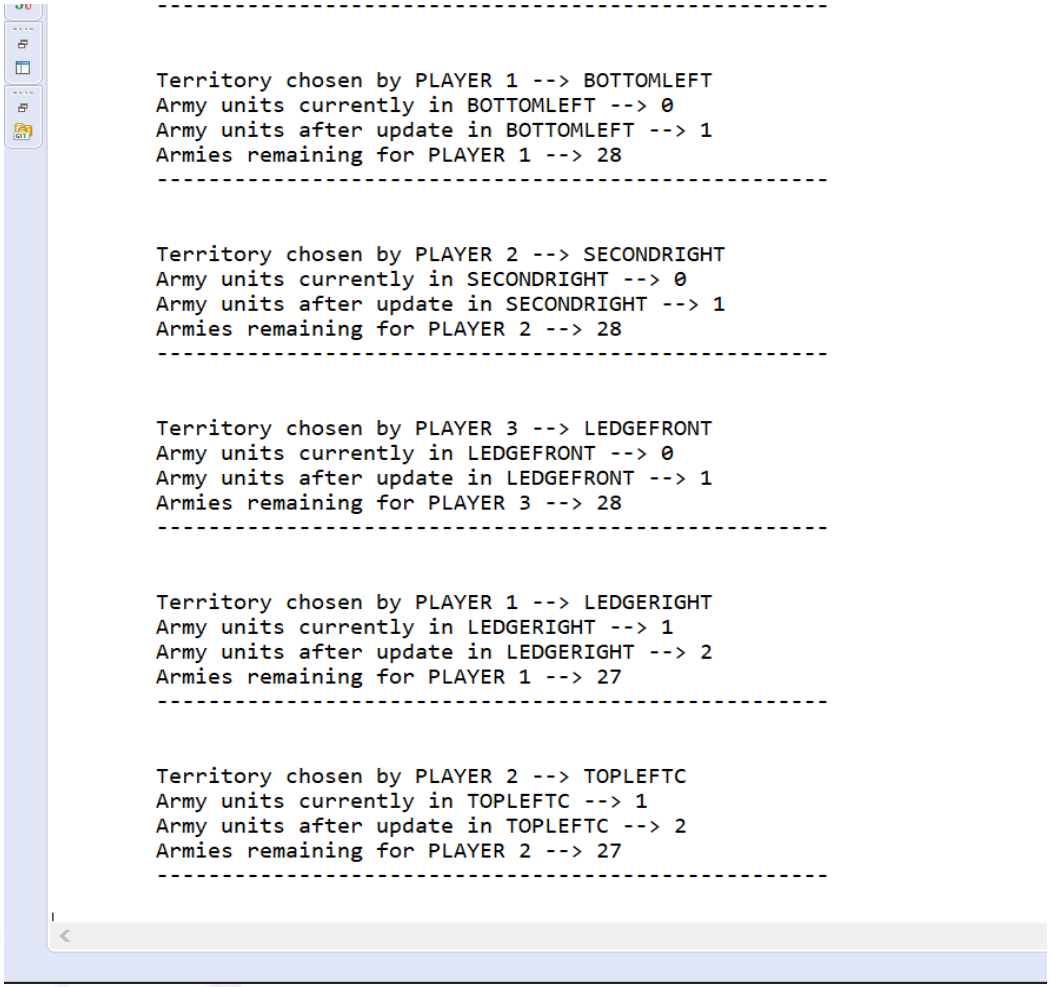
Tournament Mode Options

Screenshots

```
--------------------------------------------------------------------------------
************************** TOURNAMENT STARTS **************************
--------------------------------------------------------------------------------



--------------------------------------------------------------------------------
************************** GAME 1 BEGINS **************************
--------------------------------------------------------------------------------
Strategies ::
{1=benevolent, 2=cheater, 3=aggressive}
--------------------------------------------------------------------------------
************************** START UP PHASE   **************************
--------------------------------------------------------------------------------

        TOTAL NUMBER OF TERRITORIES ON THE MAP : 21
        TOTAL NUMBER OF PLAYERS IN THE GAME : 3


        Number of Territories assigned to PLAYER 1 : 7
        Number of Territories assigned to PLAYER 2 : 7
        Number of Territories assigned to PLAYER 3 : 7

        NUMBER OF ARMY UNITS PROVIDED INITIALLY TO EACH PLAYER : 35


        TERRITORIES ASSIGNED TO PLAYER 1 ->

                ------------------------------------
                Territory : ledgeright
                          Continent : ledge
                          Armies : 0
                          Adjacent Countries : ledgecentre,thirdright,secondright,bottomright
                ------------------------------------
                Territory : bottomleft
                          Continent : bottom
```

Start Up Phase

Screenshots



Deployment in Start Up Phase

Screenshots

```
------------------------------------------------------------------------
********************* REINFORCEMENTS FOR PLAYER 1 *************************
------------------------------------------------------------------------


      ******CALCULATION OF REINFORCEMENTS BY NUMBER OF TERRITORIES OWNED******

      TOTAL NUMBER OF TERRITORIES OWNED BY PLAYER 1 : 7
      REINFORCEMENTS RECIEVED AS PER NUMBER OF TERRITORIES OWNED : 3


      ******CALCULATION OF REINFORCEMENTS BY EXCHANGE OF CARDS******

      Cards Available to PLAYER 1 -> NONE
      EITHER 3 SIMILAR CARDS OR 3 DIFFERENT CARDS CAN BE EXCHANGED

      0 REINFORCEMENTS RECIEVED AS NO CARD EXCHANGE PERFORMED



      ******CALCULATION OF REINFORCEMENTS BY CONTINENTS OWNED******

      Territories owned by PLAYER 1 in continent bottom -> bottomleft,bottomright
      Number of territories owned in bottom : 3 out of total 4 territories in bot


      NO TERRITORIES owned by PLAYER 1 in continent clifftop
```

```
Number of territories owned in bottom : 3 out of total 4 territories in bottom


NO TERRITORIES owned by PLAYER 1 in continent clifftop


Territories owned by PLAYER 1 in continent ledge -> ledgeright
Number of territories owned in ledge : 1 out of total 4 territories in ledge


Territories owned by PLAYER 1 in continent leftstair -> secondleft,firstleft
Number of territories owned in leftstair : 2 out of total 4 territories in leftstair


Territories owned by PLAYER 1 in continent rightstair -> fourthright
Number of territories owned in rightstair : 1 out of total 5 territories in rightstair


NO REINFORCEMENTS RECIEVED AS PLAYER 1 DOES NOT HAVE ANY CONTINENT CONQUERED


TOTAL REINFORCEMENTS RECIEVED BY PLAYER 1 -> 3


TERRITORIES OWNED BY PLAYER 1 ->


      -----------------------------------
      Territory : ledgeright
                Continent : ledge
                Armies : 6
                Adjacent Countries : ledgecentre,thirdright,secondright,bottomright
```

Reinforcement Phase View

Screenshots

```
                Armies : 3
                Adjacent Countries : bottomleft,bottomrightc,firstleft,ledgefront
        ----------------------------------
        Territory : firstleft
                Continent : leftstair
                Armies : 8
                Adjacent Countries : secondleft,bottomleft,bottomleftc


********************* PLACEMENT OF REINFORCEMENT ARMIES START ***********************


A territory with LEAST army units chosen : fourthright
        Army units in territory updated from 2 to 5
        Reinforcements Remaining : 0

STATUS OF TERRITORIES OWNED BY PLAYER 1 ->

    ledgeright owned in  continent ledge
    Armies in ledgeright : 6
    Adjacent territories to ledgeright are ledgecentre,thirdright,secondright,bottomright
-----------------------------------------------------------------
    bottomleft owned in  continent bottom
    Armies in bottomleft : 4
    Adjacent territories to bottomleft are bottomleftc,firstleft,ledgefront
-----------------------------------------------------------------

    fourthright owned in  continent rightstair
    Armies in fourthright : 5
    Adjacent territories to fourthright are thirdright,fifthright
-----------------------------------------------------------------
    bottomrightc owned in  continent bottom
    Armies in bottomrightc : 3
    Adjacent territories to bottomrightc are bottomleftc,bottomright,ledgefront
-----------------------------------------------------------------
```

Placement of Reinforcement Armies (Benevolent Strategy)

Screenshots

```
************* PATHS AVAILABLE FOR FORTIFICATION ***************

BOTTOMLEFT to BOTTOMLEFTC

BOTTOMLEFT to FIRSTLEFT

BOTTOMLEFTC to BOTTOMLEFT

BOTTOMLEFTC to BOTTOMRIGHTC

BOTTOMLEFTC to FIRSTLEFT

BOTTOMRIGHTC to BOTTOMLEFTC

FIRSTLEFT to BOTTOMLEFT

FIRSTLEFT to BOTTOMLEFTC

FIRSTLEFT to SECONDLEFT

SECONDLEFT to FIRSTLEFT


**************PERFORMING FORTIFICATION **********************

Source Territory : bottomleft
Eligible WEAKEST destination territory : bottomleftc

Moving 3 Army Units from bottomleft to bottomleftc
```

```
**************PERFORMING FORTIFICATION **********************

Source Territory : bottomleft
Eligible WEAKEST destination territory : bottomleftc

Moving 3 Army Units from bottomleft to bottomleftc


Army Units in bottomleft before moving army units : 4
Army Units remaining in bottomleft after moving army units : 1

Army Units in bottomleftc before recieving army units : 3
Army Units in bottomleftc after recieving army units : 6


TERRITORIES STATUS' OWNED BY PLAYER 1 AFTER FORTIFICATION PHASE ->

    ledgeright owned in continent ledge
    Armies in ledgeright : 6
    Adjacent territories to ledgeright are ledgecentre,thirdright,secondright,bottomright
-----------------------------------------------------------------------

    bottomleft owned in continent bottom
    Armies in bottomleft : 1
    Adjacent territories to bottomleft are bottomleftc,firstleft,ledgefront
-----------------------------------------------------------------------
    fourthright owned in continent rightstair
    Armies in fourthright : 5
    Adjacent territories to fourthright are thirdright,fifthright
-----------------------------------------------------------------------

    bottomrightc owned in continent bottom
    Armies in bottomrightc : 3
    Adjacent territories to bottomrightc are bottomleftc,bottomright,ledgefront
-----------------------------------------------------------------------
    secondleft owned in continent leftstair
```

Fortificaiton Phase (Benevolent Strategy)

Screenshots

```
********************* CHEATER PLAYER REINFORCEMENT START ************************


Territory chosen : topleftc
        Army units in territory doubled. Updated from 4 to 8


Territory chosen : thirdleft
        Army units in territory doubled. Updated from 3 to 6

Territory chosen : ledgecentre
        Army units in territory doubled. Updated from 7 to 14


Territory chosen : firstright
        Army units in territory doubled. Updated from 5 to 10

Territory chosen : bottomright
        Army units in territory doubled. Updated from 7 to 14


Territory chosen : thirdright
        Army units in territory doubled. Updated from 4 to 8

Territory chosen : secondright
        Army units in territory doubled. Updated from 5 to 10


STATUS OF TERRITORIES OWNED BY PLAYER 2 ->
    topleftc owned in  continent clifftop
    Armies in topleftc : 8
    Adjacent territories to topleftc are topleft,toprightc,topright,ledgecentre
---------------------------------------------------------------------
```

Reinforcement Phase (Cheater Strategy)

Screenshots

```
************************* WORLD DOMINATION STATISTICS ********************************
--------------------------------------------------------------------------------
*                       PLAYER 1 DOMINATES 9.0% OF THE TOTAL WORLD                **
*                       PLAYER 2 DOMINATES 85.0% OF THE TOTAL WORLD                *
*                       PLAYER 3 DOMINATES 4.0% OF THE TOTAL WORLD                **
--------------------------------------------------------------------------------
********************************************************************************
--------------------------------------------------------------------------------
```

```
************************* WORLD DOMINATION STATISTICS ********************************
--------------------------------------------------------------------------------
*                       PLAYER 1 DOMINATES 0.0% OF THE TOTAL WORLD                 **
*                       PLAYER 2 DOMINATES 100.0% OF THE TOTAL WORLD                  **
*                       PLAYER 3 DOMINATES 0.0% OF THE TOTAL WORLD                 **
--------------------------------------------------------------------------------
********************************************************************************
--------------------------------------------------------------------------------

--------------------------------------------------------------------------
*************************** PLAYER 2 WINS  ***************************
--------------------------------------------------------------------------
```

World Domination View

obrigado
Dank U
Merci
mahalo
Köszi
спасибо
Grazie
Thank you
mauruuru
Takk
Gracias
Dziękuję
Děkuju
danke
Kiitos