Problem Statement for Civilization

High Level Problem Summary

We are practicing the design approach of Test Driven Development by recreating the board game Civilization.

Introduction

In the board game, Civilization, players start with a single city, a single scout, and a single army. Over the course of the game, players will take turns expanding their empire, growing their armies, building wonders, and enhancing their scientific knowledge. Each civilization must focus on a path towards victory, either through a military, science, culture, or economic victory. As the game goes on, players can explore the map for precious resources and start up trades with other civilizations. All of this occurs while players constantly improve the infrastructures of their cities by enhancing the land around them with upgradeable buildings that provide various resources. One of these resources, known as Trade, is used to gain new technologies for a civilization, granting powerful bonuses and abilities.

In a single turn of play, the game starts out in the first phase, known as “Start of Turn”. In this phase, each player, in turn, creates a new city if available, chooses whether or not to change governments, and collects any rewards from wonders or culture cards. Next is the “Trade” phase. In this phase, all players simultaneously add up all “Trade” produced by their cities and scouts and add them to their collective pool. Then players are free to barter with each other for various resources and actions. After this is the “City Management” phase, in which each player takes turns developing their civilization. For each city owned, players have the choice to either produce a unit or building, collect culture, or collect a resource in the tiles surrounding the city. This is the main phase of the game. Next comes the “Movement” phase. In this phase, players take turns moving any scouts or army figures owned on the map up to a certain number of non-diagonal spaces away, known as Speed. Players can use this phase to explore any villages or huts on the map and also to initiate combat with another player. The final phase is the “Research” phase. In this phase, players choose to either spend their Trade to research a technology or to save their Trade for a future turn.

Summary of Primary Success Criteria

- A simple GUI portrays the board game successfully and has multi-language support
- The game supports most of, if not all, associated pieces/cards
- The game recognizes when a player has won and stops the game accordingly

Scope

- *Inside*
    - Display board and all relevant text
    - Five phases of a turn
        - Start of turn
        - Trade
        - City Management
        - Movement
        - Research
    - Combat (simplified?)
    - A variety of victory conditions (specifics TBA)
        - Culture
        - Science
        - Militaristic
        - Economic
- *Outside*
    - AI
    - Animation
    - Network Capabilities

Detailed Problem Statement

FUNCTION

The solution must allow a player to play the board game and determine when a player has won

Key Business Features

- Simple, yet informative, GUI
- Support for English and Spanish
- The game works smoothly and provides the user with entertainment

Form

This project will be done using Java. Performance and reliability are key because we want the user to be able to successfully play the game without any bugs or errors.

Key Attributes

- Performance & Capacity
    - Must perform logic check quickly with no notice on the user end
- Reliability & Availability

    - Must not randomly crash or throw unexpected errors during gameplay
- Usability
    - Must be reasonably easy to pick up and learn
    - Must support multiple languages
- Modifiability, maintainability, and customizability
    - Must remain flexible to support the inclusion of additional features in future releases
    - Must be well documented and clean
- Testability
    - Must keep testability in mind at all times
    - Must be able to run most if not all tests with a single button

Hardware & Software Constraints

This project will be implemented using the Java language, with the JUnit framework for testing and until further notice, the Swing package for GUI implementation. The project will be developed on the Lenovo W520 machine. In addition, we will be using ECLEmma as our java code coverage analysis tool in Eclipse.

Required Standards

The project must be implemented with a Test Driven Design and develop a regression test suite.

Time

The project, split up into several milestones, has a due date of March 16, 2013, which is when we present the project. In addition, the project video is due a day later, March 17, 2013. The milestones are split up as follows:

1. March 11, 2013 - Project proposal using lightning talks
2. March 15, 2013 - Project proposal via problem statement and meeting with professor
3. March 22, 2013 - Class Diagrams, Development Timeline, & Coding Standards
4. May 1, 2013 - Metrics & Intermediate Status Report
5. May 9, 2013 - Updated Problem Statement
6. May 16, 2013 - Project Presentation
7. May 17, 2013 - Project Video
8. May 17, 2013 - Project Reflection & Team Evaluation

Feature Implementation Order

In terms of the order in which we will implement the game in terms of features, we

will begin by creating the game board with different tiles. We will implement the placement of the player's initial city and two initial units. The player moving his units will then implemented making sure that they can only move where possible and that the controls of the GUI work. We'll implement player and unit logic and as the GUI is created we will add it to the board.

From there, more information will be added to the board such as the trade and production values. These values will then be summed around a single city. The market screen will also be implemented with a few of the various cards. These buildings will be able to be built based on their production requirements.

In the next interaction, we will implement some tech tree cards and their effects. Culture cards will also be started with the system of acquiring them in place and a few of the actual cards in place.This will include important people tokens as well. The player screen will become necessary at this point and will be created for displaying and selecting these new cards and information.

Combat will be the next thing done, with a new GUI window for dealing for that. This will also include acquiring units from the market. More cards of each type (tech, culture, market) will also be added throughout.

We will continue adding onto the different cards and implement the various win conditions. Also, if not already implemented by the different terrain and tech cards, coins will be implemented to a fuller extent.

If any time remains, we will finish adding the remaining cards and implement wonders if possible.

Key Stakeholders

Christopher O'Hara	Development & Testing	Christopher O'Hara
Josh Harbison	Development & Testing	Josh Harbison
Spencer Murphy	Development & Testing	Spencer Murphy

Revision History

Date	Version	Reason for Change	Edited By
03/14/2013	0.1 Draft	--	Christopher, Josh, Spencer

03/17/2013	1.0 First Submission	Dr. Hewner gave us suggestions to change during our meeting with him	Christopher, Josh, Spencer
3/28/2013	1.1	Updating document - schedule/timeline and code coverage analysis tool	Christopher