LEAP Technical Debt Demonstrator Reference Manual

Olivier Heidmann, CERTH

Hariklia Tsalapatas, UTH

LEAP Technical Debt software manual

Contents

I.   Introduction

Technical debt is "a concept in programming that reflects the extra development work that arises when code that is easy to implement in the short run is used instead of applying the best overall solution". Technical debt can be compared to monetary debt. If technical debt is not repaid, it can accumulate 'interest', making it harder to implement changes later on. Unaddressed technical debt increases software entropy. Technical debt is not necessarily a bad thing, and sometimes (e.g., as a proof-of-concept) technical debt is required to move projects forward. On the other hand, some experts claim that the "technical debt" metaphor tends to minimize the impact, which results in insufficient prioritization of the necessary work to correct it. As a change is started on a codebase, there is often the need to make other coordinated changes at the same time in other parts of the codebase or documentation. Required changes that are not completed are considered debt that must be paid at some point in the future. Just like financial debt, these uncompleted changes incur interest on top of interest, making it cumbersome to build a project. Although the term is used in software development primarily, it can also be applied to other professions.

The Technical Debt software aims at raising awareness of the players to this concept and how to manage it in their work life. This software is mainly targeted towards computer science students but the core concept can be broadly applied to almost all projects situations.

The game is supposed to be played in short sessions of a few minutes on an Android cellphone, tablet or other mobile device. The demonstrator is multilingual: English, Spanish, Portuguese, Estonian, and Greek are the currently supported languages. The software has been created using Unity.

II.   Word of caution

The demonstrator is a work in constant progress. This means that the online version of the game is updated frequently in order to add new features and correct bugs, up to several times a day. So until the software reaches it's very final version, this manual is also a work in progress.

You might find for example that there are some discrepancies between some screenshots and the actual images included in the manual, or maybe some features in the software are not detailed in the manual. Don't worry, it just means that a new version of the manual is about to be published.

If you have any question, please feel free to send an email to the lead developer at this email address, he will answer you promptly: olivier.heidmann@gmail.com.

III.   The Software

1. Gameplay concept

The game mimics the development of an IT project aiming at create some code. The team is using an AGILE methodology, where the work is typically divided in segments called sprints. In the demonstrator the project is implemented during the course of 10 sprints. Those sprints are treated as turns in a turn-by-turn game and the players have to make a decision at each of those turns: do they invest in some available method to help alleviate the technical debt incurred by the project or do they do nothing?

If something is done to reduce the technical debt, it's an investment which will have an immediate cost and benefits deferred in time. So the player has to choose wisely in order to maximize the net value of the code created by the project. At the end of the 10 turns, a summary will show the final net value obtained by the players' decision.

The amount of coded produced and the amount of technical debt of the projects produced in one sprint are decided by a roll of dice. To be more precise by the roll of 8 dices ranging from 2-5 (used to be 1 to 6 but that introduced too much randomness) for the new value of code produced and the roll of 4 dices ranging from 2 to 5 for the technical debt.

2. The introduction screen

TECHNICAL DEBT

Co-funded by the
Erasmus+ Programme
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Figure 1: The introduction screen

On the introduction screen of the demonstrator the user is greeted with the LEAP and European Community Erasmus+ logo. This screen fades out in 2 seconds.
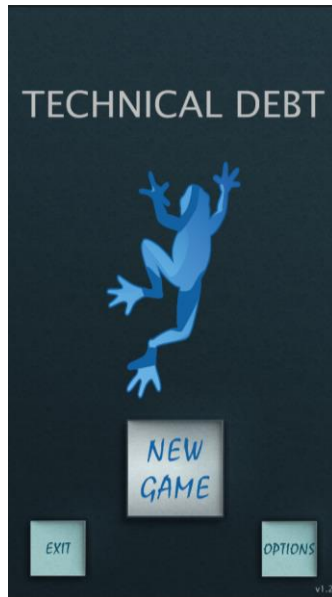
3. The main menu

Figure 2: The main menu

The main menu offers the player three choices: exit the game, start a new game or check the available options.
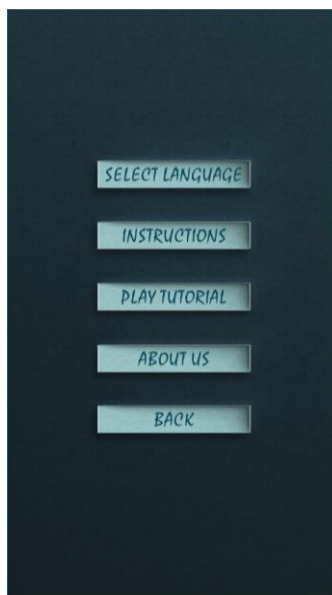
4. The options menu

Figure 3: The option menu

Several options are available here:

- Changing the language of the software between one of the 5 available ones

Figure 4: The available languages

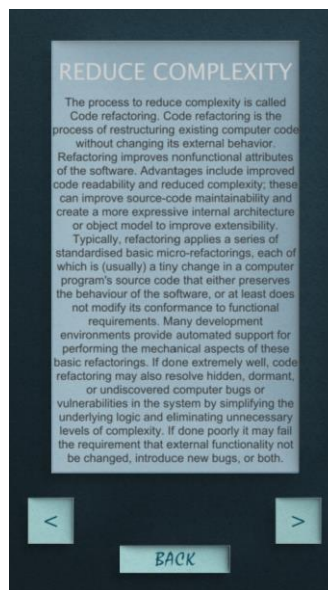- Getting extensive information about what are the underlying concepts of the game in the instructions page

Figure 5: Instructions page giving information about the game concepts

- Playing a tutorial version of the game which explicitly gives to the player all the usually hidden key information to make the most informed decision

Figure 6: The tutorial version of the game

- Accessing the project web portal (http://leapproject.eu/) by clicking the About Us button

Figure 7: the LEAP project web portal

- Go back to the main menu

5. Sequence of a game

When a sprint starts, the players need to choose which type of investment they will make to reduce the technical debt of the project.
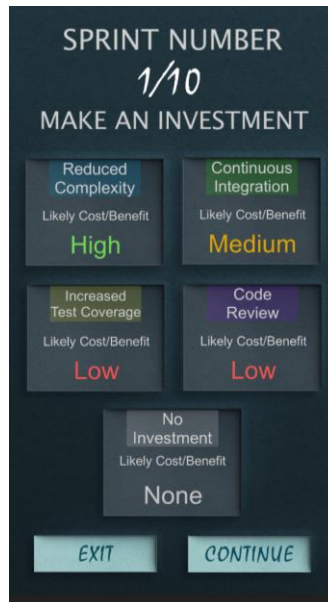

Figure 8: Selecting an investment

Once the investment is selected, the players see the result of their decision with a screen displaying the costs and benefits of the selected option and the average new value and debt of the project. Of course the player can only know the consequences of their decision after they have been made.
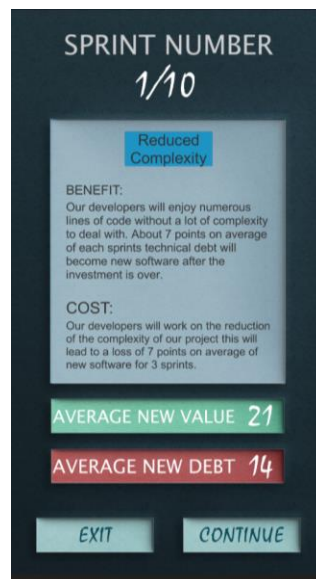

Figure 9: The result of the investment

The following screen shows a graphical representation of the evolution of the value created throughout all the sprints.

Figure 10: Graphical evolution of the value of the project code in time

The Grey box at the top is a recapitulative of all the actions taken so far, the green box indicates the green value created this sprint, the red box indicates the debt incurred, the purple box gives the net value, which corresponds to the net value minus the debt. The yellow box indicates the cumulative value created so far and the graphic shows how much value as been created over time, with a baseline being indicated at 15.

At some points, the players might have the chance of modifying once the value of the new debt created. This option is indicated by a red circle near the value of the debt. Clicking/tapping on the circle generates a new number for the debt value.
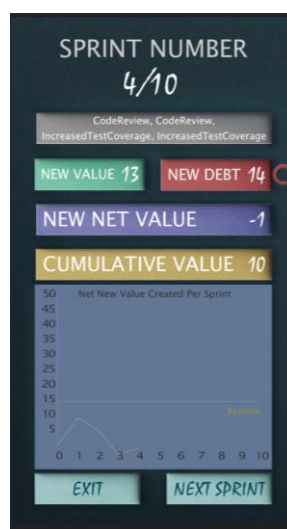

Figure 11: The red circle option

Once the game reaches 10 sprints, the game ends and displays the total cumulative value created and the personal best value ever created by the players. The graph showing the evolution of the value in time is available by clicking/tapping the "Show Results" button.
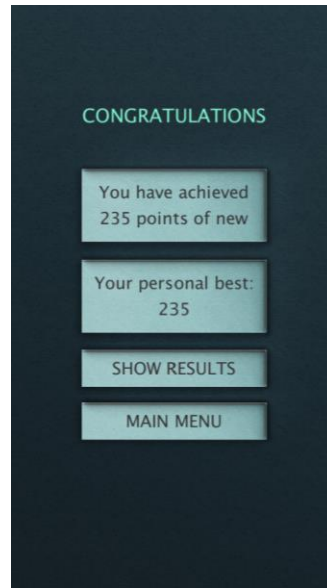

Figure 12: Final screen

Annex: Table of figures