UNIVERSITY OF SALERNO

Department of Computer, Electrical and Applied Math Engineering

Computer Engineering Master's Degree

Course I-Z : Group 4

PW: Software Architecture Design

Teacher
Prof. Pierluigi Ritrovato

Students
G. Imparato, L.N. Lavista
M. Ripesi, M. Lombardi

Academic year 2024/2025

Contents

Chapter 1

Pre-game

1.1 Main viewpoint of the project

Utilities

Trello Board: *click here*.

GitHub Repository: *click here*.

Member chosen as Product Owner (current phase): Lucia Nancy Lavista

Team roles:

- Lucia Nancy Lavista - Developer;
- Gabriele Imparato - Developer;
- Mario Ripesi - Developer;
- Mariapia Lombardi - Developer.

User Stories

This section presents all user stories, organized by topic. The *Fibonacci sequence* has been chosen as the preferred scale for Story Point estimation. The user stories are the following:

- *Drawing and shapes*:
  - DS1: as a user, I would like to have a user interface, so i can create drawings;

  - DS2: as a user, I would like to choose among segments, rectangles and ellipses, so I can compose the drawing with different basic shapes;
  - DS3: as a user, I would like to choose among at least 8 colors for the stroke color, so that I can customize the drawing;
  - DS4: as a user, I would like also to choose the infill color of a closed geometrical shape, so I can color my drawings;
  - DS5: as a user, I would like to save the drawing on a file, so I can recover it later;
  - DS6: as a user, I would like to load a file, so I can continue to modify my drawing;

User Stories	**Story Points**
DS1	2
DS2	2
DS3	2
DS4	3
DS5	3
DS6	3

Table 1.1: Story points for drawing and shapes

- *Shapes alteration*:
  - SA1: as a user, I would like to select a shape clicking on it, so I can modify or drag it;
  - SA2: as a user, I would like to delete a selected shape, so I can remove elements from the drawing;
  - SA3: as a user, I would like to change the position, the dimensions and the colors of a selected shape, so I can modify it;

User Stories	**Story Points**
SA1	3
SA2	2
SA3	5

Table 1.2: Story points for shapes alteration

- *Advanced operations*:
  - AO1: as a user, I would like to cut, copy and paste shapes, so I can duplicate and move them around;

  - AO2: as a user, I would like to undo any modification, so I can correct any mistake;
  - AO3: as a user, I would like to put a shape in the background or foreground, so I can check shape overlapping;

User Stories	Story Points
AO1	5
AO2	8
AO3	3

Table 1.3: Story points for advanced operations

- *Navigation and zoom*:
  - NZ1: as a user, I would like to change zoom settings with at least 4 options, so I can observe the drawing more in detail or in its entirety;
  - NZ2: as a user, I would like to scroll the view of the drawing if it is larger than the windows, so I can navigate in the entire workspace;
  - NZ3: as a user, I would like to visualize an adjustable optional grid, so I can easily allign the shapes;

User Stories	Story Points
NZ1	3
NZ2	3
NZ3	5

Table 1.4: Story points for navigation and zoom

- *Advanced Shapes*:
  - AS1: as a user, I would like to draw arbitrary poligons, so I can create more complex shapes;
  - AS2: as a user, I would like to insert text as objects, even choosing text dimensions, so I can take notes in the drawing;

User Stories	Story Points
AS1	5
AS2	5

Table 1.5: Story points for advanced shapes

- *Shapes Transformation*:
  - ST1: as a user, I would like to rotate the shapes at different angles, so I can position them freely;
  - ST2: as a user, I would like to mirror the shapes vertically or horizontally, so I can create simmetries;
  - ST3: as a user, I would like to stretch shapes along an axis, so I can change its proportion;

User Stories	**Story Points**
ST1	8
ST2	5
ST3	5

Table 1.6: Story points for shapes transformation

- *Pooling and custom commands*:
  - PC1: as a user, I would like to select more shapes at once and group them, so I can move and modify them all together;
  - PC2: as a user, I would like to ungruop shapes, so I can modify them singularly;
  - PC3: as a user, I would like to create a command for adding a new kind of shape, so I can reuse it in future;
  - PC4: as a user, I would like to save the commands created by the user in the specific draw, so I can reuse them when I reopen the file;
  - PC5: as a user, I would like to export and import custom shape libraries, so I can share or reuse them in future;

User Stories	**Story Points**
PC1	5
PC2	3
PC3	8
PC4	3
PC5	5

Table 1.7: Story points for pooling and custom commands

Definition of Done

- The user story must be fully implemented;
- Acceptance criteria met;
- Unit and integration test of functionality successfully completed;
- Code must be commented;
- Write Javadoc for each module;
- Functionality must be committed and pushed to remote repository (only after testing).

AGGIUNGERE PRIORITA' ALLE USER STORIES, GUARDARE BENE TUTTI I PUNTI E METTERE LE PRIORITA';

Language and Development Environment settings

- **Java** as programming language;
  - Libraries:
    - JavaFX;
    - Canvas;
  - Version:
    - Java 8;
- **GitHub** as preferred versioning program;
- **Trello** for keeping track of user stories (story points);
- **Apache Netbeans 12.5 IDE** as Integrated Development Environment;
- **Overleaf**, **Microsoft Word** and **Microsoft Excel** for documentation reports.

Type	**Convention**
Class	`PascalCase`
Interface	`PascalCase`
Method	`camelCase`
Variable	`camelCase`
Constant (`final static`)	`UPPER_SNAKE_CASE`
Package	`lower.case.com`

Table 1.8: Adopted Java naming conventions

Design Characteristics

The application adopts the Model-View-Controller (MVC) architectural style to separate concerns between interface, logic, and control. The *Controller* acts as a mediator, managing input and coordinating between *View* and *Model*. To enhance flexibility and extensibility, design patterns like *Decorator* (for dynamic shape styling) and *Command* (for undoable actions) are applied. This architecture improves modularity, testability, and scalability, allowing the team to develop and maintain features independently while ensuring a clean and maintainable codebase.

1.2 Product Backlog

In this section are resumed the progresses of the project, keeping track each user stories. The main rules are:

- Priority: 1 (Less important), 2, 3, 4, 5 (More important);
- Status: To Do, In progress, Blocked, Code Review, Awaiting QA, Done;
- In Sprint Backlog: 1st, 2nd, Fnl, No.

The total amount of Story Points is 120Sp, for a simple computation the sum is divided in three parts for measuring *sprint velocity*. Said so, the first sprint velocity is set to 40sp, to be adjusted at the end of the first development cycle.

User Stories	Story Points	Priority	Status	In Sprint Backlog
DS1	3	-	To Do	1st
DS2	2	-	To Do	1st
DS3	2	-	To Do	1st
DS4	3	-	To Do	1st
DS5	3	-	To Do	1st
DS6	3	-	To Do	1st

Table 1.9: Story points for drawing and shapes

User Stories	Story Points	Priority	Status	In Sprint Backlog
SA1	3	-	To Do	1st
SA2	2	-	To Do	1st
SA3	5	-	To Do	1st

Table 1.10: Story points for shapes alteration

User Stories	Story Points	Priority	Status	In Sprint Backlog
AO1	5	-	To Do	No
AO2	8	-	To Do	No
AO3	3	-	To Do	No

Table 1.11: Story points for advanced operations

User Stories	Story Points	Priority	Status	In Sprint Backlog
NZ1	3	-	To Do	No
NZ2	3	-	To Do	No
NZ3	5	-	To Do	No

Table 1.12: Story points for navigation and zoom

User Stories	Story Points	Priority	Status	In Sprint Backlog
AS1	5	-	To Do	No
AS2	5	-	To Do	No

Table 1.13: Story points for advanced shapes

User Stories	Story Points	Priority	Status	In Sprint Backlog
ST1	8	-	To Do	No
ST2	5	-	To Do	No
ST3	5	-	To Do	No

Table 1.14: Story points for shapes transformation

User Stories	Story Points	Priority	Status	In Sprint Backlog
PC1	5	-	To Do	No
PC2	3	-	To Do	No
PC3	8	-	To Do	No
PC4	3	-	To Do	No
PC5	5	-	To Do	No

Table 1.15: Story points for pooling and custom commands

1.3 Accepatance Criteria

Chapter 2

First Sprint

2.1 Burndown Chart

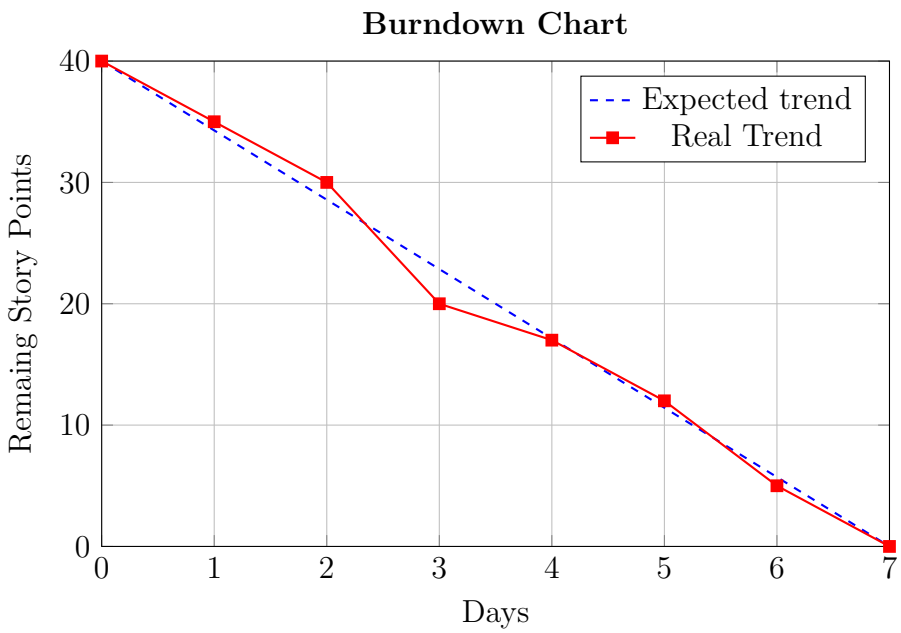

Figure 2.1: Burndown chart for first sprint

Chapter 3

Second Sprint

3.1 Burndown Chart

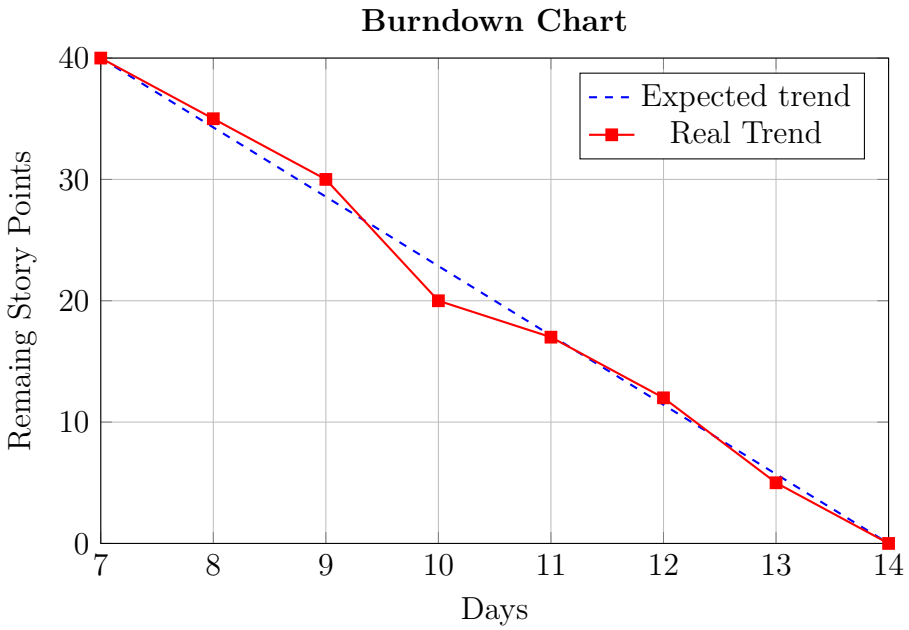

Figure 3.1: Burndown chart for second sprint

Chapter 4

Final Sprint

4.1 Burndown Chart

4.1.1 Sprint chart

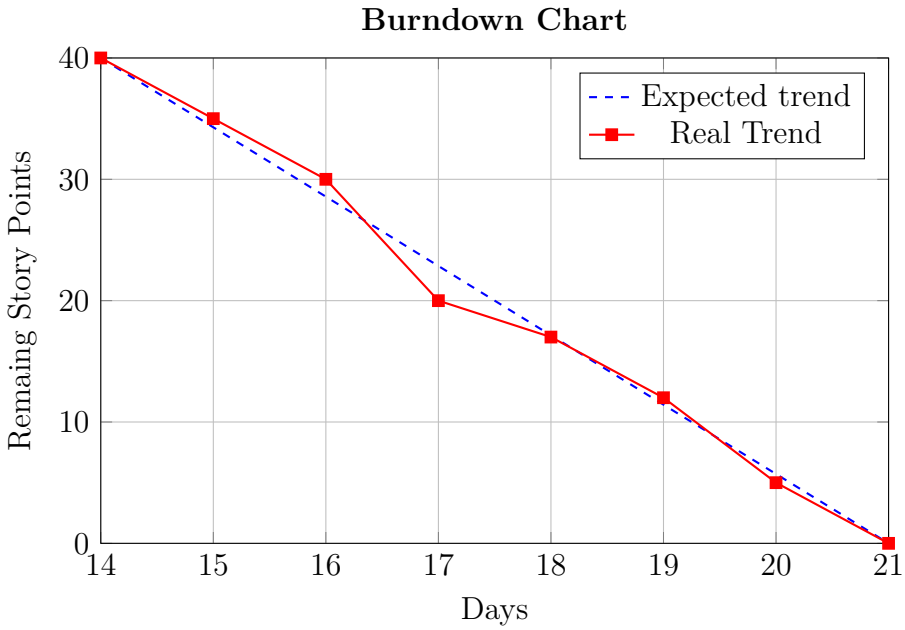

Figure 4.1: Burndown chart for final sprint

4.1.2 Final chart

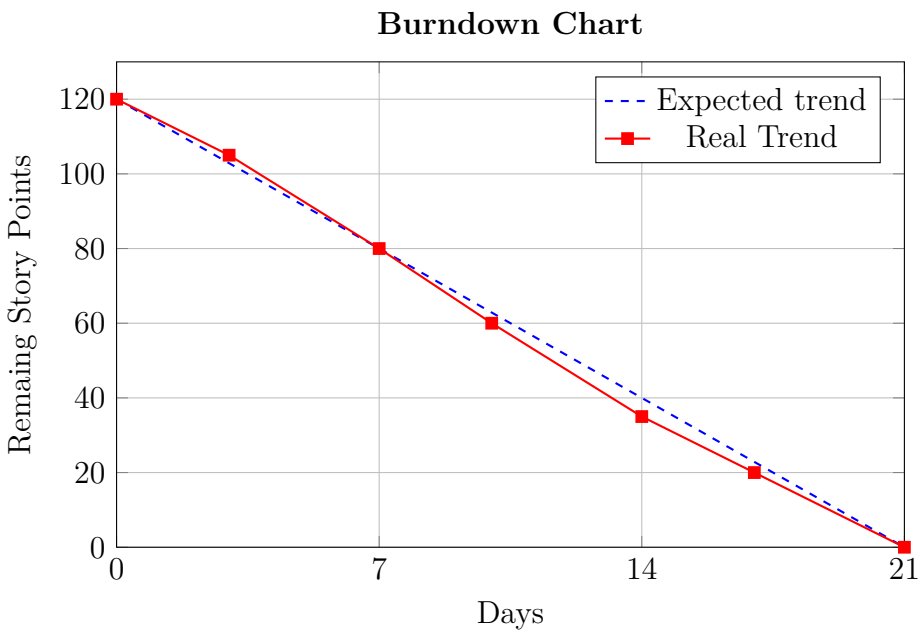

Figure 4.2: Burndown chart (total 120 SP)