2006ICT / 2805ICT / 3815ICT Object Oriented Software Development

Assignment Specification: Milestone 1

Assignment Title: Tetris Game Development (or Approved Alternative System)

Submission: Milestone 1

Due Date: End of Friday of Week 5 (22/08/2025)

Objective

The primary objective of this assignment is to utilize Object-Oriented Software Development principles and the Java programming language to develop a system that demonstrates good design and implementation practices. By default, students are expected to develop an enhanced version of the classic Tetris game.

However, if a group prefers to develop an alternative system, the following conditions apply:

- The group must submit a **proposal** that clearly describes the alternative system.
- The proposal must demonstrate that the system's complexity and difficulty level are comparable to the Tetris game.
- The proposal must identify and map specific features of the alternative system to the expected functions (features) of the Tetris game.
- The proposal must be submitted to both the **lab tutor** and the **course convenor** by the **end of Week 2**.
- The proposal requires formal approval from the lab tutor and course convenor before the group can proceed with the alternative system.

Background

Tetris is a classic puzzle video game originally designed and programmed by Alexey Pajitnov in 1984. The game involves players manipulating tetrominoes, shapes composed of four square blocks each, which descend onto a playing field. The goal is to fit these shapes into complete rows, which then disappear, earning points for the player. The game ends when the tetrominoes stack up to the top of the playing field and no more shapes can enter.

General Functions

To understand the general requirements, please study the provided demo video for milestone one. This will give you a comprehensive understanding of the gameplay mechanics, user interface, and features required for your implementation.

Submission

The submission for this milestone is a Word or PDF document based on the template provided on the course website. The document must include the following:

1. **GitHub Project Link**:
    - Provide the link to your GitHub project repository.
    - Ensure that you have invited your **lab teacher** to your project so they can access it. You can ask your lab teacher for their GitHub ID in your lab session.
2. **Demo Video Link**:
    - Include a link to a video that demonstrates your game or approved alternative system.
    - Detailed instructions for the video will be provided later in this specification.

Note: Each group only needs to make one submission. A student (preferably the team leader) should submit the document on behalf of the entire group.

Overall Marking Criteria

The assignment will be assessed based on the components and points outlined below. This provides a clear overview of how marks are distributed across different sections of the project:

#	Section	Title	Points
1	Project Management	Project Planning	5
2	Project Management	Peer Review	5
3	Requirement Analysis	Functional Requirements (FR)	5
4	Requirement Analysis	Non-Functional Requirements (NFR)	5
5	Requirement Analysis	Use Case Diagram	5
6	Requirement Analysis	Activity Diagram	5
7	Implementation	GitHub	5
8	Implementation	GitHub Advanced	5
9	Implementation	File Structure	5
10	Implementation	Coding	10
11	Demonstration	Video Quality	5
12	Demonstration	Splash Window	5
13	Demonstration	Main Screen	5
14	Demonstration	Configuration Screen	5
15	Demonstration	High Score Screen	5
16	Demonstration	Game Play	5
17	Demonstration	Erase Full Rows	5
18	Demonstration	Pause Function	5
19	Demonstration	Exit Function	5

Total: 100 points

Detailed Marking Criteria

The following sections provide detailed descriptions and requirements for each of the above components.

Project Management

1️⃣ Project Planning (5 points)

- Provide a clear and organized project plan using the template provided on the course website.
- The plan should define the major tasks, assign responsibilities to group members, estimate time for each task, and track actual time spent.
- Include a summary of group meetings and the tools used for communication and project management.

2️⃣ Peer Review (5 points)

- Complete the peer review process using the provided template.
- Each member must submit a self-review and reviews of all other group members, providing fair and constructive assessments.
- Include a summary of peer review findings in the submission.

👉 **Note:** Individual student marks may be adjusted based on the details provided in the project management. The adjustment method will be outlined in the template provided.

Requirement Analysis

3️⃣ Functional Requirements (FR) (5 points)

- Provide a list of functional requirements that correspond **only to the features demonstrated in the Milestone 1 demo video**.
- Each functional requirement should include a unique ID, a clear description, and follow the precondition-event-postcondition pattern.
- Requirements must be complete, consistent, unambiguous, and testable.

4️⃣ Non-Functional Requirements (NFR) (5 points)

- Provide at least one non-functional requirement for each of the **URPS categories** (Usability, Reliability, Performance, Supportability) in the FURPS+ model.
- Each NFR must have a unique ID, be testable, and clearly indicate its category.

5️⃣ Use Case Diagram (5 points)

- Create a use case diagram based on your functional requirements.
- The diagram must use correct UML notation and describe services provided to the user without implementation details.

6️⃣ Activity Diagram (5 points)

- Draw an activity diagram showing the flow from **starting a new game** to **ending a game**.
- The diagram must follow UML notation and include key activities (e.g., play game, pause, game over).
- There is no need to include configuration or high score updates in this diagram.

Implementation

7️⃣ GitHub (5 points)

- Provide the GitHub repository link and a clear screenshot of the commit history.
- Marks may be deducted for too few commits, poor commit messages, or commits clustered within a short period.

8️⃣ GitHub Advanced (5 points)

- Demonstrate the use of GitHub features including **pull requests**, **code reviews**, and **tags**.
- Provide supporting screenshots as evidence.
- All group members must contribute.

9️⃣ File Structure (5 points)

- Provide a screenshot of your GitHub repository file structure.
- The structure must follow the standard **IntelliJ project layout with Maven build**.
- Ensure no nested projects (i.e., no project directory inside another project).

1️⃣0️⃣ Coding (10 points)

- Provide code snippets (via screenshots) demonstrating your use of:
  - `JavaFX`
  - Enhanced `for` loops
  - Enhanced `switch` statements or expressions
  - Interfaces
  - Abstract classes
  - Java `Record` types
- Snippets must come from your actual project code, not from external examples.
- For each code snippet, please provide a short paragraph explaining its purpose and functionality.

Demonstration

👉 The marking criteria in the Demonstration section will be assessed entirely based on your submitted video. Please note that you only need to provide the video link in your submission document — there is no need to upload the video file itself. You may host your video on a public platform such as YouTube. If anything in this section is unclear, please refer to the Milestone 1 demo video provided on the course website.

1️⃣1️⃣ Video Quality (5 points)

- Submit a video (max 7 minutes) demonstrating your system.
- The video must be clear, narrated, and show all required features.

1️⃣2️⃣ Splash Window (5 points)

- Show a splash window at startup with your group identity, course code, and other relevant information.
- The splash window should be centered and displayed for a few seconds.

1️⃣3️⃣ Main Screen (5 points)

- Demonstrate the main screen containing at least **Play**, **Configuration**, **High Scores**, and **Exit** buttons.

1️⃣4️⃣ Configuration Screen (5 points)

- Show a functional configuration screen with settings for field size, level, music, sound effects, AI play, and extended mode.
- A **Back** button must return to the main screen.

1️⃣5️⃣ High Score Screen (5 points)

- Show a high score screen listing the top 10 scores (dummy data acceptable).
- Include a **Back** button to return to the main screen.

1️⃣6️⃣ Game Play (5 points)

- Demonstrate the game field (10x20), smooth tetromino movement, and basic controls (arrows for move/rotate).

1️⃣7️⃣ Erase Full Rows (5 points)

- Show correct detection and erasure of full rows, including multiple-row erasure and proper color maintenance.

1️⃣8️⃣ Pause Function (5 points)

- Show the game pausing/resuming with the **P** key, and display an appropriate paused message.

1️⃣9️⃣ Exit Function (5 points)

- Show the **Exit** button confirmation dialog with working **Yes** (exit program) and **No** (return to main screen) options.

Penalties

1️⃣ Unprofessional documentation

- Submissions with poor or inconsistent layout, spelling or grammatical errors, overly small fonts, or low-resolution images may incur a penalty of up to **10 points**.

2️⃣ Late submission

- Late submissions will receive a penalty in accordance with the University's late submission policy.

3️⃣ Lab progress checks

- From the second lab session (Week 3), each group's progress will be checked by the lab teacher during the lab.
- The **team leader** or a designated group representative must report the group's progress and any issues to the lab teacher.
- If no group members can attend the lab for any reason, they must contact the **lab teacher** before the session to arrange an alternative check or submit their progress and issues in writing.
- Groups should use this opportunity to clarify any unclear aspects of the assignment or lab tasks, and may seek help if needed. It is encouraged that students first discuss issues within their group before escalating to the lab teacher or course convenor.
- If issues cannot be resolved by the lab teacher, they will be forwarded to the course convenor.
- **Penalty:** Failing to attend a lab progress check will result in a **5-point deduction** for the assignment:
    - Week 3, 4, 5 checks: deducted from **Milestone 1**
    - Week 6–11 checks: deducted from the **final submission**

4️⃣ Access issues

- Please ensure that your lab teacher can access your GitHub repository and demonstration video. If either is not accessible, you will receive **zero** for the relevant marking items.