EE-310 – « Systèmes Embarqués Microprogrammés »:
Final NDS Project Preparation Requirements and Submission Guidelines

● **List of I/O peripherals of the NDS platform to include in the project**

All the components in the following list, **from 1 to 6, are mandatory** to implement in the final NDS project to attend the oral exam and pass the course. However, you can add some of the optional I/O peripherals (numbers 7-9 in the list) to improve your grade towards the maximum grade (6) in EPFL courses.

To consider the use of the peripheral valid, you must comply with the detailed instructions given for each peripheral. For example, only using one background per engine will be considered incomplete for graphics engine requirements.

1. **ARM Processors**
   Both ARM processors in the NDS must be used in your final project:
   - ARM9 processor - Describe what you use it for (e.g., which peripherals it controls).
   - ARM7 processor - Describe what you use it for (e.g., which peripherals it controls).
2. **Timers and associated interrupts**
   - At least <u>one timer and its associated interrupt</u> must be used and correctly configured.
3. **Graphics engines**
   - Both the <u>main engine and sub engine</u> must be used during the complete project.
   - <u>More than one background</u> must be used on the two engines.
   - <u>Different types of background configurations</u> must be used (not necessarily in the same engine).
4. **Keypad**
   - At least <u>one key</u> or the touchpad keys must be used in the project.
   - At least <u>one key interrupt</u> must be used to consider this part completely done.
5. **Touchscreen**
   - The <u>exact touch position</u> should be detected and used to change the project behavior.
6. **Sound**
   - <u>Music</u> must be used (at least one piece of music).
   - <u>Sound effects</u> must be included (at least two different effects).
7. **Secondary Storage (Optional)**
   - <u>At least one value needs to be stored and retrieved</u> by the NDS during the operation of the project.
8. **Wifi (Optional)**
   - At least two NDS should be <u>exchanging UDP messages</u>.
9. **Sprites (Optional)**
   - At least one sprite needs to be used in the project and <u>correctly use the dynamic memory allocation part (e.g., there cannot be dynamic memory leaks)</u>.

Your code for the project should be well-structured and well-commented, including a meaningful description of the functionality of each function and variable used in the project. A poorly commented code that is hard to read can negatively impact your grade. **You should also provide instructions** on how to start and play the game.

The **usage of Git is also mandatory**. This will help you prove that both members of the team contributed and that you had a working version in case your final submission accidentally includes some bugs.

● Grading criteria

The minimum requirement for getting a passing grade (4) in the final project is to fully implement peripherals 1-6. To get a higher grade in the final oral exam, you must comply with all the following points:

1. **Implement at least one of the optional peripherals** (numbers 7-9 in the list), and note that all the additional peripherals are required for a perfect grade (6) in the course.
2. Have a **complete and bug-free game**. A game is considered complete when it includes start and restart options, and a scoring system. Bugs include memory leaks, mistakes in the game logic, malfunctioning keys, freezing etc.
3. **Correctly answer the questions** to showcase a solid understanding of the NDS graphics and peripherals and justify their usage in the project.

During the oral exam, **both members** of the team are expected to **know all parts of the code** and be able to **explain and justify the usage of each peripheral**, even if the workload was split during the project development (i.e. one member has implemented the keypad and another the touchscreen).

If a member of the team is unable to explain part of the provided code and its utility, the corresponding points of that peripheral will be deducted from the individual final grade, resulting in different grades between the two team members.

● Submission Deadline and Instructions

The submission deadline for the project is **23h59 on Thursday, January 16th, 2025.** The submission link is on the course Moodle page. Please upload the compressed folder with:

1. Complete project (uncompiled, but with the final NDS binary file expected to be generated with the provided source code),
2. Presentation (using the template below),
3. Instructions on how to play the game.

Only one member of the group should submit the project on behalf of both members. If any of the three elements above are not included in the submission, points will be subtracted from the final grade to both members of the team.

● Project Presentation Template

A template for the project presentation is available on the course Moodle at the following link:

https://moodle.epfl.ch/pluginfile.php/2802480/mod_resource/content/5/TemplateProjectNDSpresentation.pptx

Keep in mind that **you will have 5 minutes to present your project** using the presentation that you have submitted to us before the deadline. Please avoid a lengthy presentation and keep it to the point, otherwise you will be requested to stop to leave time for the demo and questions about your project.

● Final oral exam format

Part 1: Presentation – 5 minutes

Part 2: Demo, where the proctor will play the game on the NDS and assess possible bugs and functionality issues – 5 minutes

Part 3: Questions from the professor and the TAs – 10 minutes