

Computer Labs: Project – Specification

2º MIEIC

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Project Specification

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Project Specification

Google Form

- ▶ Fill Google form for the project proposal/specification
 - ▶ Provide a somewhat detailed description of your project
 - ▶ Many groups usually provide a one line description: this is not enough
 - ▶ Provide information regarding each device you plan to use
 - ▶ **Role** of the device in your project
 - ▶ E.g. the mouse buttons are used for menu selection
 - ▶ **Functionality** used of the device
 - ▶ E.g. mouse buttons and movement.
 - ▶ Fill in a field with the URL of a PDF file (see next bullet)

PDF File

- ▶ Containing:
 1. A list of the modules that you plan to implement
 2. A development plan
- ▶ You must upload this document in PDF somewhere to the Web

Modules

- ▶ Most likely, one per device
 - ▶ Although you could use one further module for the KBC
- ▶ Other modules will depend on the project. Possible modules:
 - ▶ Dispatcher, which processes events and invokes the corresponding handlers
 - ▶ Graphics module
 - ▶ Menu module
 - ▶ Program logic
 - ▶ Serial port protocol
 - ▶ Timers module

Plan

- ▶ The previous sections described the what, this will describe the:

When?

Who?

- ▶ Each module must have one student that is responsible for it
 - ▶ You must specify who did what in the final report
- ▶ Use the demo on the last lab class to guide your plan
 - ▶ You are supposed to use the 3 mandatory devices
 - ▶ Should show something specific to your project rather than something generic, such as a menu
- ▶ Suggestion:
 - 1st week Graphics
 - 2nd week Add animation (timer)
 - 3rd week Add user input (keyboard)
- ▶ Be aware of the 90-10 rule:
 - ▶ 10% of the work takes 90% of the time
 - ▶ The remaining 90% take ... 90% of the time

I.e. implementation takes at least twice as much as we expect

Possible Paths

Bottom Up

- ▶ Complete the functionalities that you'll need from each device

Top Down

- ▶ May be not that suited for this course

Both

- ▶ One member starts at the bottom and the other at the top, and meet somewhere in the middle

Whichever

- ▶ Test thoroughly as you develop

Grading

- ▶ Project specification is 5% of the project grade
 - ▶ We will apply its own difficulty/originality factor

Difficulty Factor

- ▶ Number, type and features used of I/O devices
- ▶ Number and detail of the modules. For example:
 - ▶ Is every module assigned to a group member?
- ▶ Quality of the plan
 - ▶ Is it execution/demo oriented?
 - ▶ Is it reasonable
 - ▶ We will grade the specification only after the submission of the project.

Originality Factor

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Additional Devices

- ▶ For project grades above 85% (17/20) you are required to use:
 - ▶ RTC - Real-Time Counter
 - ▶ UART - Serial port communication

You must use the mouse, to score any points from the use of these devices.

- ▶ We will cover these devices in future lectures (one per lecture)
 - ▶ Grading of the specification will not consider them
- ▶ Nevertheless, if you plan to use them, you are advised to try to include them also in your specification:
 - ▶ Of course, we do not expect you to be as detailed
 - ▶ In spite of all the limitations, your plan will be more realistic

The Real Time Clock (RTC)

- ▶ Integrated circuit that maintains:
 - ▶ The date and
 - ▶ The time of the dayeven when the PC is switched-off and unplugged
- ▶ In addition, it:
 - ▶ Includes alarm functionality and can generate interrupts at specified times of the day;
 - ▶ Can generate interrupts periodically
 - ▶ Includes at least 50 non-volatile one-byte registers, which are usually used by the BIOS to store PC's configuration

Serial Port (UART)

- ▶ Akin to a network card, i.e. it allows communication between PCs
- ▶ But:
 - ▶ Only, point-to-point, i.e. between two PCs
 - ▶ Much slower (forget about sending video using the UART)

Final Project Grading (1/2) (From 1st lecture)

Execution: 35% + 10%

- ▶ 10% for demo in the last lab class

Code: 20%

- ▶ Structure and Modularity
- ▶ Documentation (use Doxygen)
- ▶ Readability
 - ▶ Names and comments
 - ▶ Indentation
- ▶ Compilation warnings

Final Report: 20%

- ▶ Summary of what is and what is not implemented;
- ▶ Usage instructions (with images)
- ▶ Description of the program's architecture
- ▶ **Relevant** implementation aspects (grades above 18)
- ▶ Function call diagram

Video: 5% A short video with a demo of your project

Tools: 5% (Git) (We expect you to commit to GitLab@FEUP's repository at least once a week, and to log messages then)

Project Specification: 5%

Final Project Grading (2/2) (From 1st lecture)

- ▶ To the grade obtained by applying the above criteria, we'll apply:

Difficulty Factor

- ▶ Several aspects
 - ▶ number and type of I/O devices
 - ▶ features used of the I/O devices
 - ▶ the techniques used (interrupt vs. polling)
 - ▶ use and extent of assembly programming

Originality Factor

Marketing Bonus

- ▶ of 1 valor for the participation in the Semana Profissão Engenheiro (SPE), sometime in March 2020 (?)
 - ▶ These students often become monitors in following years
- ▶ In recent years, we have selected about 3 projects per year