Computer Labs: Project – Specification
2º MIEIC

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Contents

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) in the Documents module of your Redmine project

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 to the Documents module of your Redmine project

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
  - ▶ Sound/music module (if you'd like to use sound – but check it first)
  - ▶ 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

Contents

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 day

    even 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)

Contents

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% (SVN) (We expect you to commit to the SVN 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

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

Originality Factor

Team Management Factor

- ► load share among group members

Marketing Bonus

- ► of 1 valor for the participation in the Semana Profissão Engenheiro (SPE), 15, 16 and 17 of April (it used to be in March)
- ► in recent years, we have selected 3 or 4 projects per year