Computer Labs: Project – Proposal

2º MIEIC

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Project Proposal (Google Form)

- Fill Google form for the project proposal
  - 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 displacement.
- The following devices are **mandatory** (max. score: 65%):
  - Video card in **graphics** mode
  - Timer
  - Keyboard
- You must use the mouse, so that you can use the RTC or the serial port
  - What is the RTC? And the serial port?

Project Examples

- Games: timer, keyboard, mouse, graphics mode (=standard)
- Two user games: standard and serial port
- Electronic calendar: standard and RTC
- Music composer/player: standard
- Text editor: standard
- Typing tutor: timer, keyboard, graphics mode (=required)
- File transfer between PCs: standard and serial port
- Chat between PCs: standard and serial port
- Drawing/paint program: standard and serial port
- Video player with a VP8 video decoder: standard and RTC

Final Project Grading

Difficulty

- number and type of I/O devices
- features used of the I/O devices
- the techniques used
  - interrupt vs. polling
  - application-independent handlers
  - events (to handle asynchrony)
  - state machines
- computer graphics (not as relevant as you may think)
  - double buffering
  - animation
  - collision detection
- ~~use and extent of assembly programming~~

Originality

- features not used in the labs

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

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)

Final Project Grading

Execution: 45%

- 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 Proposal: 5%