



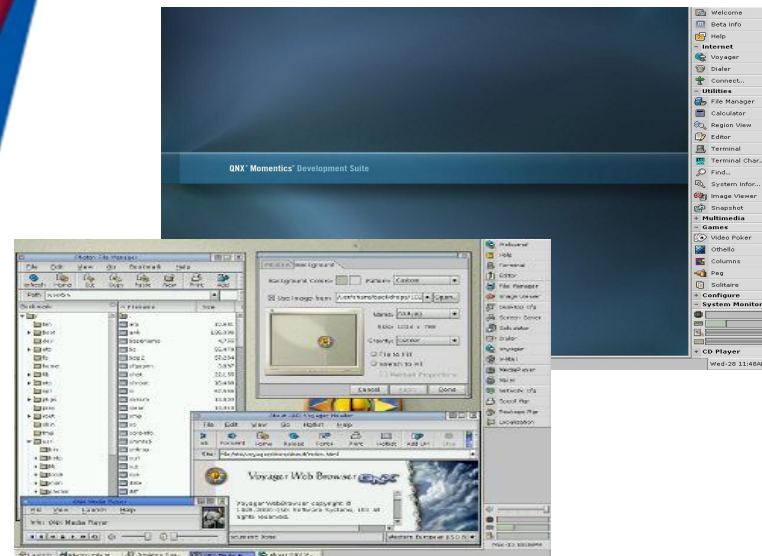
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## Supplementary Guidance

### Major CA

- *General Guidelines for*
- *PC metronome*

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## Group project

- Course Weightage: 3 x Minor CA (40% of course total)
- Group Size: 4-6 members (typ.)
- Submission Dateline: Friday, 19 November 2021
- *You choose your own group members*

### General Requirements

- Participation
  - Peer Assessment
- Programming, Debugging & Report preparation
- Group Submission
- Submit one program (executable + source code)
- Accompanying report
- **Report:**
- Hardcopy Report + Softcopy of files
  - Copy to Lab. Drive (Instructor PC)
    - One folder containing source & executables
    - Report, source code, executable.
    - Folder named (MCAXX) xx as per submission index





## Grading Scheme

- Report: 40%
  - Content as indicated in previous slide
  - Credit given for quality of presentation
- Program: 60%
  - Functionality & comprehensiveness.
  - Programming techniques and range of functions used
    - Scope of functions, modularity, structure etc.
    - Novelty and comprehensive use of functions
  - “User Friendly”, innovative features/interpretation
    - Ease of use
    - Error checking
  - Robustness
    - Stable, does not crash or hang
  - Precise instructions and contextual messages



## Report Structure

- Full name of all members and a group photograph identifying individual members
  - Description of the program and its use
    - Comment on any positive attributes of your program and its uniqueness
  - Instructions for use
    - With screen shots of the computer display (as appropriate)
  - Appendix:
    - Commented program listing with indentation
    - Flowchart
- *Page limit of report 10 to 15 pages (not inclusive of appendices)*

## Basic Requirements – PC Metronome

- Signal Generator
  - Generate a “precise” and regular waveform
    - Using a timer (more challenging)
      - Or a software “delay”
    - Design a visual (& auditory) queue on the screen
      - Use DA/DA output creatively.
  - Accept rate and display options
    - via the kbd (keyboard) entry.
    - via keyboard “arrow keys” to change settings.
    - Via switches (analog or digital)
- Use of command line arguments for initial setup.
  - Open default setting file or another.
- Additional Requirements
  - The outputs must continue uninterrupted
    - whilst waiting for a new setting
    - Visual & auditory queue must be synchronised
  - Interesting “Graphics”
    - Explore ncurses
  - Deploy Real-time programming techniques
    - Incl. Threads, timers, interrupts, mutex

A **signal generator** is a devices that generates signals with specific properties of amplitude, frequency, and wave shape.

These generated signals are used as a stimulus for electronic measurements.

- Write codes as modular subroutines
- Do this now, as you learn how to perform multi-threaded processes



## Additional Functionality (Bonus tasks)

- Read/write data to file on hard-disk or portable drive.
  - Last configuration, data, user settings etc.
- Responsiveness of Program
  - Ease of use
- Synchronisation between all I/O
  - If appropriate
- Accuracy of events
  - Fastest Rate, accuracy
  - Determine realistic parameters
    - As per mechanical metronome
- Multi input/output modes
- Friendly and informative User Interface (UI)
  - Provide useful instruction when an input is incorrect

## Demonstrate Programming Skills, Techniques & Creativity

- Multi threaded processes (preferred)
  - Unless you can rationalize otherwise
- Inter-process or inter-thread communication & synchronisation
  - Use threads &/or processes, timers
    - as appropriate
- Use of alarms/signals etc.
- Trapping of Ctrl+ C
  - SIGINT signal
  - Orderly shutdown of program
    - Clear display and release resources.



## Others

- Esthetically appealing report
  - With matching content
- Clean & clear screen display
- Comprehensive and appropriate comments
  - in program listing