

# EECS 22L: Software Engineering Project in C Language

## Lecture 10

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## Lecture 10: Overview

- Project 2 Technical Discussion and Advise
  - Software architecture and components
- Discussion on GUI programming
  - GTK+ library
  - GTK clock server example

## Project 2: Software Architecture

- Overall System Specification (designed by consultant)

Taxi Cab Management Server

- Taxi fleet management
- Optimal navigation, routing
- Optimal scheduling
- Accounting of revenue and expenses
- Central data structures

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## Project 2: Client-Server Communication

- Discussion on Socket Communication
  - Sequence Diagram for client-server example

```

sequenceDiagram
    participant Client
    participant Server

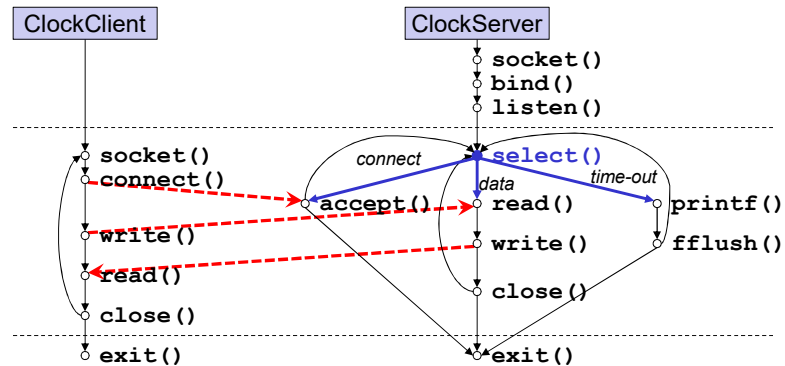
    Client->>Client: socket()
    Client->>Server: connect()
    Client->>Server: write()
    Server->>Server: accept()
    Server->>Server: read()
    Server->>Client: read()
    Server->>Server: write()
    Client->>Server: read()
    Client->>Client: close()
    Server->>Server: close()
    Client->>Client: exit()
    Server->>Server: exit()
    
```

- This simple example can handle only one client at a time, others have to wait for their turn to connect (they are blocked)
- Blocking communication can stall both the client and the server!

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## Project 2: Client-Server Communication

- Multiplexing multiple client connections with `select()`
  - ClockServer example: `~eecs22/ClockServer.tar.gz`



- Wait simultaneously to connect, to transfer data, or for time-out!
- Keep sequential execution short
- Limit client-server interaction to one request at a time

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## Project 2: GUI Programming

- GTK+ 2.0 Library Infrastructure
  - Tutorial: <https://developer.gnome.org/gtk-tutorial/stable/>
  - Reference: <https://developer.gnome.org/gtk2/2.24/>
  - Widgets: <https://developer.gnome.org/gtk2/2.24/ch02.html>
  - Cairo graphics: <https://cairographics.org/samples/>
  - Cairo tutorial: <http://zetcode.com/gfx/cairo/>
- GUI clock server example:
  - `~eecs22/GTK_ClockServer.tar.gz`
  - `GTK_ClockClient.c`
  - `GTK_ClockServer.c`
  - `Makefile`, `README`
- Online demonstration!

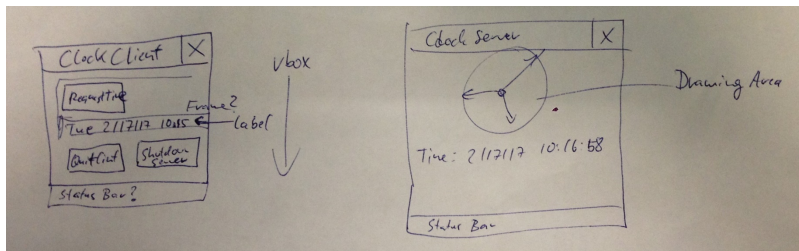
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## Project 2: GTK Clock Server Example

- Sketch of the Client and Server Windows



## Project 2: GTK Clock Server Example

- Screenshot of the Client and Server Windows

