VirginiaTech
Invent the Future

Final Project

ECE 4564 - Network Application Design

Dr. William O. Plymale

ece
BRADLEY DEPARTMENT
of ELECTRICAL & COMPUTER ENGINEERING

Final Project Theme

Covid-19 Vaccination Passport System

https://time.com/5952532/vaccine-passport-history/

https://www.youtube.com/watch?v=RyWdIm57fpE

https://www.usnews.com/news/health-news/articles/what-to-know-about-coronavirus-vaccine-passports-and-travel

Final Project Guidelines

The final project report is an opportunity for you to:

- Demonstrate your knowledge of network application concepts from class

Project Requirements

- Your system must have a significant network component
- Your system must be highly dependent on network communications to work
- Projects should be challenging – more complex than assignments

Final Project Guidelines

The ECE 4564 final project is a design project that incorporates the major topics covered in class this semester.

Project must:

- Use one or more of the three network communication mechanisms discussed in class
  - Sockets
  - Message queues (RabbitMQ)
  - RESTful interactions
- Use MongoDB as a NoSQL instance
- Have a web UI (Flask with REST API)

Final Project Guidelines

- The final project is a team project.
  - Will consist of current 2-person assignment teams
  - Your project idea should be sophisticated enough that team members can make a significant contribution to the project

- Your project is to be realistic, using current technologies

- Major code portion must be Python3

- Your final project can contain a mobile component:
  - Android
  - iOS

What is a Network IoT Application?

Your project needs to incorporate and demonstrate at least one of the following:

- Real-time communication with physical objects
- Resource and location Discovery
- Ambient Information / Calm Technology
- Adaptive Interfaces
- Event Notification
- Context Awareness (user / time / location)

Hardware Element

Without supporting hardware like a Raspberry Pi, your system will consist of a software-only implementation.

However, you can, and are encouraged to, include laptop hardware elements: camera, microphone, speakers into your system design.

Final Project Report

For the final project you'll need to write a design document that discusses the following items:

1. Concept of operations
2. System overview
   a) System Diagram
   b) Description of system modules
   c) Your three (3) testable requirements

Concept of Operations (CONOPS)

CONOPS is a high level description of a system's purpose, goals, and how users will interact with the system to achieve goals.

Your CONOPS statement should answer the following questions:

- What is my system doing?
- What is the goal of my system? (i.e. What real-life challenge am I looking to address or solve?)
- Why is this goal meaningful and important? (i.e. why should I pay for this?)
- How will a user interact with my system?
- How will my system achieve the stated goals? (i.e. What outcomes and impact, do you as designers, expect your system to have?)

System Overview

The System Overview is a logical breakdown of your CONOPS into discreet pieces or modules, where you describe what each module does, and how it interacts with other modules

Describe your system

- What are the major pieces?
- What is each piece supposed to do?
- How will each piece accomplish its given task?
- How do those pieces combine or couple?
- For this project, many of the pieces should be coupled via a network (i.e. a custom socket protocol, HTTP, AMQP, or another protocol)

Your design document includes a visual diagram of your system depicting the major pieces, their interactions and network connections.

Testable Requirements

Requirements form a set of statements that describe the user's needs and desires. Requirements statements describe what the software system should be, but not how it is to be constructed.

Evaluation of your requirements is based on the following characteristics:

1. Your requirements should express what your product / application / system must do and how well it must operate. Every requirement should identify an operational function and its associated measures of effectiveness.
2. Requirements must be unambiguous. Requirements should not be expressed using language that may be vague or unclear. A properly stated requirement should be written in a manner that leads to one, and only one, interpretation.
3. When expressing requirements, many times the requirement uses the verb **"must"** to indicate that a feature is an essential requirement of a piece of software or larger system.

Examples

- Nursing home system must perform successful face recognition when admitting visitors.
- Web UI must support 50 concurrent users.
- System must assist in the prevention of prescription drug overdoses.
- System must support a voice-controlled interface.

Testable Requirements

In your proposal you must state at least 3 clearly defined testable requirements

- Your requirements will be used to grade your final project.
- Each major component of your system should have at least one testable requirement.
- Each team member is responsible for at least one of the testable requirements.

Final Project Grading

- Final Project Report – 10%
  - Minimum: 5 pages Maximum: 7 pages
  - Single-spaced

- Final Project Code – 10%

- Project Video – 5%
  - Explain and demonstrate your system showing all testable requirements.
  - 3 minutes
  - Kaltura

- Grading will have a subjective element.

Project Submission

- Your final project report is a single PDF file:
  - TeamXX_Final_Project_Report.pdf
- Submit to Canvas by Sunday, May 9 @ 11:55PM

- Your final project code submission is a single ZIP file
  - TeamXX_Final_Project_Code.zip
- Submit to Canvas by Sunday, May 9 @ 11:55PM

- Use Kaltura in Canvas to make your video.
- All team members must participate in project video.
- Submit your video to Canvas by Sunday, May 9 @ 11:55PM

Closing