

Diram Tabaa

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EDUCATION

Carnegie Mellon University

B.S. COMPUTER SCIENCE | CGPA: 4.0

Expected Graduation: May 2024 |

Coursework: Intro to Computer Systems (15-213); Intro to Functional Programming (15-150); Principles of Imperative computation (15-122); Matrices and Linear Transformations; Discrete Differential Geometry (15-458)

Programming Languages: C, Python, standard ML (SML), Javascript, x86-64/IA32 Assembly

Languages: English (Bilingual), Arabic (Native), Turkish (Basic)

Extra-Curricular: Member of the Student Academic Committee, Motion Graphics and VFX

PROJECTS

CACHING HTTP PROXY SERVER IN C

- Implemented a Proxy server that acts as a middle-point between client-server communications
- The Proxy server parses the client HTTP request and sends a modified version of the request to the server. The Proxy relays the server response to the client
- Once a proxy receives a connection request, the client is served on a separate thread to allow for concurrent requests
- The proxy has a global cache of recently accessed web-pages to reduce the repetition of requests to servers. The cache is protected by a readers-writers lock to prevent race conditions.

DYNAMIC MEMORY ALLOCATOR PACKAGE FOR C

- Implemented a dynamic memory allocator library matching the interface of the `malloc` package.
- Reduced internal fragmentation by storing block metadata in least significant bits of pointers maintaining 8-byte alignment
- Reduced external fragmentation by coalescing neighbouring blocks
- increased throughput by implementing segregated lists of free blocks to reduce search time

TINY LINUX SHELL IN C

- Implemented a Linux shell that provides the basic features of a shell program, such features include:
 - performing job control of foreground and background jobs
 - performing I/O redirection
 - stopping jobs and continuing them either as foreground or background and allowing user to terminate foreground jobs through **keyboard interrupts**

EXPERIENCE

QATAR COMPUTING RESEARCH INSTITUTE |

INTERN

| December 2021 – Present

- Working under the supervision of **Dr. Husrev Taha Sencar** on projects stemming from the work done in the summer internship.
- Analyzed **ISO/IEC-14496** specifications for AVC/h264 encoded videos to determine how video data is encoded and packaged
- Designed and Implemented a verification script based on the findings from the ISO specifications.

QATAR COMPUTING RESEARCH INSTITUTE |

RESEARCH INTERN

| May 2021 – July 2021

Project: Camera Model Identification using Video Metadata

- Worked under the CyberSecurity team in QCRI, namely under the supervision of **Dr. Husrev Taha Sencar**.
- Implemented a custom web scraping tool using Python's **Scrapy** module to download and process video files off a dataset webpage.
- Upgraded a data extraction program to extract VUI parameter sets and include them in the output database files. This was done through **SQLite3** and **h264bitstream** C libraries.
- Designed and implemented an analysis script in **Python** to read database files and analyze the variation patterns of video encoding parameters.
- Presented findings to a panel of experts at the end of the internship.
- Findings were adapted to an academic paper, currently under review.

CARNEGIE MELLON UNIVERSITY |

COURSE ASSISTANT

| Jan 2021 - Present

- Duties include: providing assistance to students through Office hours, grading assignments, and meeting with course faculty