# (2023) DNA sequencing and patient prioritization assignments

# The three assignments focused on using Python to solve complex problems related to DNA sequencing and patient prioritization in personalized medicine. Students developed skills in string manipulation, algorithm design, and data structure implementation, particularly with binary heaps and priority queues. They gained experience in handling large data sets, optimizing performance, and testing code efficiently.

# Skills learned:

# Python programming

# String manipulation

# Algorithm design and optimization

# Data structures (heaps, priority queues, lists)

# Computational efficiency

# Testing and debugging

# Bioinformatics techniques

# (2024) Elevator project

# This elevator control system project involved the design, development, and testing of a PLC-based automation system, building on prior PLC programming skills. The task included creating a smooth, efficient elevator operation, handling motor control, safety mechanisms, door operations, and scheduling algorithms using a finite state machine. Key aspects included managing user safety, optimizing system performance, and minimizing wait times. The project also required teamwork, effective time management, and a comprehensive technical report.

# Skills learned:

# PLC programming (Ladder Logic, Structured Text)

# Finite State Machines

# Motor control and automation

# Scheduling algorithms

# System safety and error handling

# Team collaboration and time management

# Technical report writing

# (2024) CNC project

# Developed a low-cost, portable CNC milling machine designed for efficient PCB manufacturing. The project involved defining the problem, generating and evaluating design concepts, and selecting the optimal design using a decision matrix. The final CNC machine featured polyoxymethylene (POM) pulley wheels and belts for X and Y movement, and utilized PLA and SAE 304 stainless steel materials. Achieved a total cost of $97.22 NZD and a weight of 6.2kg. The project emphasized design for manufacturing and assembly (DfMA) and successfully met criteria for portability, affordability, and reliability.

# Skills Learned:

# CNC Machine Design

# Decision Matrix Analysis

# Design for Manufacturing and Assembly (DfMA)

# CAD Design and Prototyping

# Cost and Material Management

# Project Management and Evaluation