# Istanbul Health and Technology University

## Faculty of Engineering and Natural Sciences

## Software Engineering Department

COURSE PROJECT – SWE208  
Computing Systems

## PROJECT TITLE

Implementing Binary Representation and Control Flow in C++

## Team Members

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## Project Description

This project was developed to demonstrate basic computing systems concepts such as binary number representation, control flow, memory usage, and file input/output using the C++ programming language. The user enters a number, and the program converts this number to its binary form, prints it to the screen, and saves the result in a file named 'output.txt'.  
  
The purpose is to help understand how data is represented in binary, how to use pointers and control structures, and how to write to a file—all through a simple terminal-based application.

## Key Features

Feature 1: Binary Conversion – Converts a decimal number to binary using a loop and stores the result.

Feature 2: Pointer & Array Usage – Uses std::vector to store binary digits and pointers in function parameters.

Feature 3: File Output – Saves the original number and its binary form into a .txt file.

## Technologies

Language: C++

Development Environment: Visual Studio Code / Dev C++

Libraries: <iostream>, <fstream>, <vector>

Version Control: Git, GitHub

## Implementation

Data Structures: Used std::vector<int> to dynamically store binary digits.  
Input/Output Handling: Input is taken from the terminal and results are shown in both terminal and a file.  
Challenges: Keeping the binary output in the correct order required reversing the result vector.  
Design Decisions: Code was kept modular by separating binary conversion logic into a function. Input validation ensures that negative numbers are not accepted.

Code Snippet:  
void convertToBinary(int number, vector<int>& binary) {  
 while (number > 0) {  
 binary.push\_back(number % 2);  
 number /= 2;  
 }  
 if (binary.empty()) binary.push\_back(0); // Handles zero case  
}