Hasan Nasir

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Education

University of Toronto, Mississauga Mississauga, ON

Bachelor of Science in Computer Science, Geographic Information Systems, and Statistics *Sep. 2021 – April 2026*

- **Relevant Courses:** Software Design, Theory of Computation, Data Structures & Analysis, Software Tools & Systems Programming, Probability & Statistics

Projects

LSB-Steganography Embedder/Extractor | *Python, Git, PIL* December 2022 – Present

- Developing a Python-based LSB steganography tool for embedding hidden text data within digital images
- Algorithm utilizes each pixel's least significant bit and key-based pixel identification to store and retrieve hidden messages
- Currently in the final testing/debugging phase for embedding, preserving image quality, and key confidentiality
- Will soon support text extraction from digital images using hidden key identification

File Path Treemap Visualizer | *Python, pygame* July 2022 – August 2022

- Allows for the interactive visualization of file paths in a treemap structure, and uses Pygame to render and display the treemap
- Allows users to easily navigate through large file systems by displaying files and folders as rectangles, where the size of the rectangle represents the size of the file/folder
- Has user-friendly controls that allow for easy resizing, deleting, expanding, and collapsing of files/folders, making it easy to explore large file systems in a visually intuitive way

Boggle Pro | *Java, JavaFX, Git* November 2022 – December 2022

- A refreshed take on Boggle that adds features such as different board sizes, bonus tiles, and time limits that can be customized to tailor the gameplay experience to the preferences of the player
- Utilized Agile development methodologies with a Scrum framework in a team of 4, using GitHub for version control to ensure timely delivery of features and maintain code quality
- Enabled speech synthesis for letters and words found by players using the game, allowing players with varying understandings of English to enjoy the game

Parallel Bash Command Executor | *C, Unix Shell, Git* March 2022

- Efficiently executes shell commands in parallel by leveraging the fork() syscall in C and multi-process synchronization via signals
- Offers customization for the command-line arguments by allowing command templates and argument lists for the shell command, as well as parallelization limits for the number of running processes
- Monitors and provides a summary of the running and completed processes in real-time by registering handlers for user-defined signals.
- Supports error-handling with respect to directory creation, malloc failures, and abnormal child process exit detection

Technical Skills

Languages: Python, Java, C

Developer Tools/Libraries: Unix Shell, Bash, Git, Github, VS Code, Visual Studio, PyCharm, pygame, IntelliJ, PIL, MS Office