# Austin Jetrin Maddison

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**Designs simulation tools, rendering for visualization and editors and implementing pathfinding.**

## EDUCATION

**Mahidol University International College**                                          **Expected Graduation: Jan 2026**

B.S in Computer Science, Minor in Applied Mathematics (In major GPA 3.3)

## EXPERIENCE

**Mahidol University International College**                                          Apr 2023 - Apr 2025

Teaching Assistant                                                                    Salaya, Nakhon Pathom

- Assisted students in mastering core programming concepts across courses including **Functional and Parallel Programming, Data Structures, Abstraction & Object-Oriented Programming, and Intro to Programming.**
- Provided **personalized guidance** in problem-solving and debugging, fostering a deeper understanding of course material.
- Graded **300+ assignments** across courses using automated scripts and manual instrumentation.
- Developed and refined **technical communication** and logical analysis skills, effectively conveying complex concepts to students.

**Adapter Digital**                                                                   Nov 2023 - Mar 2024

Software Developer, Part Time                                                          Ari, Bangkok

Collaborated with design and innovation teams to create **3-player 3D game installation "Seemless City" for Bangkok Design Week 2024**.

- Implemented **real-time rendering features** such as **procedural meshes**, **HLSL shaders** using Unity's C# framework and high definition render pipeline.
- Highlight features: **dynamic multiple focal point vignetting** with variable feathering using signed distance fields (SDF), inertia **animation hooks**, fluttering cloth using **multi-scale perlin noise wind**, SDF **particle collisions**, **bloom/glare**.
- Extended **Intel RealSense's C# API** to allow for depth normalization and remapping to be used in calibration tool onsite.
- The reception was **overwhelmingly positive from 200+ participant surveys** and optional comments described that the full-body motion controls, multiplayer and 3D aspects were refreshing and unique.

**Adapter Digital**                                                                   Aug 2023 - Sep 2023

Software Developer, Internship                                                         Ari, Bangkok

Developed a **real-time motion capture 3D installation** project "Hello Mascot" for the firm's product portfolio as their part of diversifying the kinds of digital products they can give to clients. The project's reception with colleagues was very positive and **surpassed expectations**.

- Collaborated with the innovation team's C# developer to implement **motion controls** using **Google's MediaPipe** library for pose landmark detection from external camera feed to interact with virtual character and world.
- Implemented **shaders for vegetation and cloud wind, stop motion clay river water wakes, stop motion clay character** and **fully gpu-driven 2D facial animations** using multi UVs and sin/cos functions for scheduling expressions.
- Modeled, textured, animated, layout and lit environment props and character assets using high-poly to low-poly pipeline.

## PROJECTS

**Single Cycle MIPS Simulator** ⤴                                                     C++

**Developed an instruction-level simulator** for a subset of the **MIPS architecture**, supporting execution with **accurate state transitions** and **core instruction emulation** (arithmetic, branching, memory, system calls).

- **Implemented instruction parsing**, **decoding**, and **shell-based execution controls** (`go`, `run <n>`, `mdump`, `rdump`, etc.) with structured modeling of **registers**, **memory**, and **program counter**.
- **Integrated endian-aware memory functions** and **verified correctness** through simulation logs, register dumps, and extensive debugging.

**Interactive Pathfinding Algorithm Visualizer** ⤴                                    C#, HLSL, UNITY-URP

**Real-time pathfinding algorithm visualizer** with modular search support and interactive UI.

- Built a real-time algorithm visualizer supporting **multiple search algorithms** (A*, BFS, Drikjsta, Greedy) with modular architecture.
- Developed an **event-driven UI system** with dynamic updates and heuristic cost overlays.
- Integrated **real-time performance metrics** and intuitive grid editor for scenario customization.

**Shell + Terminal Animation Library** ⬀                                                    C++
  **Custom Linux shell** with animated terminal UX, command parsing, and job control.
  - Built a **simplified Linux shell** with interactive and batch modes, featuring **custom command parsing**, **built-in commands** (echo, `!!`, `jobs`, etc.), and **I/O redirection** using `fork`, `exec`, and `wait`.
  - **Implemented job control** for **foreground/background processes**, **signal handling** (`SIGINT`, `SIGTSTP`), and **asynchronous notifications** for background jobs.
  - **Designed a bash-like UX** with **prev command history**, **custom prompts**, **true-color text formatting**, and **splash screen animations** using flip-book rendering and animated UI elements.

**Hello Mascot** ⬀                                                    UNITY, C#, GOOGLE-MEDIAPIPE
  **Interactive mascot demo** enabling full-body pose tracking and stylized GPU shaders.
  - Enabled **full-body interactions** using Google MediaPipe pose tracking.
  - Designed **GPU shaders** for stylized visuals and procedural sprite based facial animation via UV sets and blending.
  - Modeled and animated high-fidelity characters for **live installations**.
  - Delivered a successful **proof-of-concept** for internal company's product portfolio.

**E-Sports Minecraft Modding and Server DevOps** ⬀       JAVA, DOCKER, HTML, JS, FFMPEG-(WEBM), PYTHON, UNIX
  **E-sports competition platform** with modding, server deployment, and participant coordination.
  - Managed **end-to-end competition logistics**, including scheduling and participant coordination.
  - Deployed **dockerized game servers** for matches, ensuring reproducibility and stability.
  - Programmed **custom mods** by forking plugins to enforce competition rules and enhance gameplay.
  - Built **static websites** and assets for onboarding and competition information using GitHub Pages.
  - Created a **registration dashboard** using Python and Google Workspace API for seamless participant management.

**HateMatch - Dating Platform Web Application** ⬀                        VUE, VUETIFY, JAVA, SPRING
  **Dating platform** web application that connects users through shared dislikes and contrasting preferences.
  - **Designed and developed** the entire frontend using Vue and Vuetify, including **user authentication**, **profile management**, and simple interactive **matching interface**.
  - Engineered **custom Vuetify theme** and a **context sensitive floating cursor** for fun profile navigation, elevating UX.
  - Integrated Java Spring backend for **secure user authentication** and data management.
  - Prototyped **matching algorithm** using pairwise user preference negation, enabling MVP-level functionality with future optimization in mind.

**Technical Blog Platform** ⬀                                    HUGO, TAILWIND, THREE.JS, FFMPEG
  **Responsive static blog** platform with custom Hugo theme, Tailwind styling, and rich media content.
  - Built a **UI framework** with custom snippets for grid-based elements, dropdown reveals, **animated thumbnails**, **embedded Three.js**, and **filter content by tag or category**.
  - Developed **parallax scrolling effects** with tag-based filtering systems, creating a visually engaging browsing experience.
  - Ensured **subtle animations for most interactable elements**, making all user interactions feel polished but doesn't get in the way of the content.

## SKILLS

**Programming Languages**
```
C#/.NET  Java  Python  JavaScript  C/C++  TypeScript  Go  Scala  Lua  VEX  GLSL
```
**Web Development**
```
HTML/CSS  React  Hugo  Tailwind  Spring-Boot  Jinja2  Flask  Vue  NextJS  Bootstrap  Vite  REST  WebAssembly
Electron  ThreeJS  Firebase  Redis  SQL  MySQL  PostgreSQL
```
**Data Science**
```
Jupyter-Notebook  NumPy  SciPy  Pandas  Seaborn  MatPlotLib  MATLAB  TensorFlow  Apache-Spark
```
**Graphics & 3D**
```
OpenGL  Godot  Unity  UE5  Houdini  Maya  Blender  Cinema-4D  Redshift  Adobe-Suite  ComfyUI  DearImGUI
CUDA  OpenCL  FFMPEG  OpenCV
```
**DevOps & Tools**
```
Git  Unix  CMAKE  JUnit  GitHub-Actions  Kafka  Apache-Airflow  Kibana-ElasticSearch  Docker
```

## AWARDS

**Outstanding Cambridge Learners Awards - Thailand: Highest Achievement Award for Digital Media and Design 2020**
  Cambridge Assessment International Education

## LANGUAGES

**English**: *Native speaker*,  **Thai**: *Conversational*