

# Python Game Hub Presentation

- Victoria Lee
- James Mutry
- Todasha Foster
- Dajin Chung
- Javon Payne
- Oluwatumininu Ipaye

### CMSC 495 Capstone Project:

- ♦ (Group 1)
- **\$** 5/3/2025





Welcome to the Python Game Hub – a multi-game application built in Python using Pygame

**Centralized interface featuring:** 

- Tic-Tac-Toe (with AI)
- Trivia (with timed responses)
- Breakout (arcade-style)
- Focused on modular design, replayability, and user-friendly navigation
- Developed through collaboration, GitHub version control, and iterative planning

### Main Menu

- 1. Information
- 2. Tic-Tac-Toe
  - 3. Trivia
  - 4. Breakout
    - 5. Exit





For our Python Game Hub, we built a multi-game application using Python and Pygame, featuring Tic Tac Toe, Trivia, and Breakout, all connected through a central Main Menu.

We used modular coding, GitHub for version control, and GitHub Actions for automated testing.

Our main tools were Python 3.9+, PyCharm, VSCode, GitHub, and Excel for manual testing.

#### Each teammate contributed:

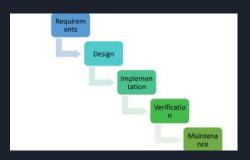
- James Mutry developed unit tests for all modules and manual testing.
- Victoria Lee handled documentation, UI improvements, GitHub Actions, and debugging support.
- Todasha Foster built the Main Menu, worked on Breakout and Trivia improvements.
- Javon Payne helped create the Main Menu and developed the Trivia game.
- Oluwatumininu Ipaye built the Breakout game with full physics and scoring.
- Dajin Chung developed the Tic Tac Toe game, including the AI logic, and assisted debugging for Trivia and Breakout.

Strong collaboration and clear task ownership helped us create a polished, fully tested application.

### Project Plans



Figure: This image below represents the plans for our team using the SDLC waterfall method



### Project Plans:

- Unit 2: Project Plan
  - [Google Drive (Docx) Link]
  - [GitHub (doc) Link]
- **Unit 3:**

### Project Design Plan

- [Google Drive (Docx) Link]
- [GitHub (doc) Link]

### Other Plans:

- Unit 4: Phase 1 Source Report Plan
  - [Google Drive (Docx) Link]
  - [GitHub (doc) Link]
- Unit 5: Testing Plan
  - [Google Drive (Docx) Link]
  - [GitHub (doc) Link]
- Unit 6: Phase 2 Source Report Plan
  - [Google Drive (Docx) Link]
  - [GitHub (doc) Link]
- Unit 7: User Guide
  - [Google Drive (Docx) Link]
  - [GitHub (doc) Link]
- Unit 8: Deployment Report
  - [Google Drive (Docx) Link]



#### **Functional Requirements**

- Main Menu Navigation:
   Users will be able to easily navigate the main menu and select any game to play.
- 2. Session Control:
  Users will be able to restart the game, return to the main menu, or exit after each session.
- Outcome Tracking:
   The system must track and display game outcomes, including winners, losers, ties, scores, and remaining lives.

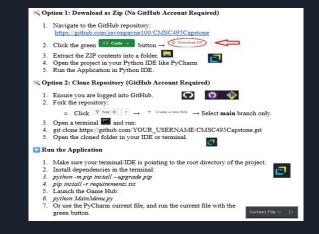
#### **Non-Functional Requirements**

- Performance:
  - Games must load within 3 seconds and run smoothly without noticeable lag.
- 2. Usability:
  - The interface should be intuitive and user-friendly, accessible to users of all ages.
- 3. Reliability:
  The system must handle all expected inputs and edge cases reliably, with no crashes.

#### [Functional/Non-Functional Requirements Link Here]

- User Guide: [Google Drive (Docx) Link] [GitHub (doc) Link]
- Unit 6: [Google Drive (Docx) Link] [GitHub (doc) Link]
- Note: Please, Refer to User Guide / Unit 6 to help set up System Requirements and System! (Images to the Right!)









The Python Game Hub utilizes the Pygame library and is a desktop-based application.

- It features three simple games and an information:
  - Tic-Tac-Toe, Trivia, and Breakout (offline)
  - Information (online, readme.md on GitHub Repo.)
- The major idea behind the project is its design that requires no installation or account setup, allowing it to be used in shared spaces such as schools and libraries.
- We aimed for a diverse audience during the project development.
- The low maintenance design allows for bug fixes and error checking without interrupting the user experience.
- The link below is the user guide for further information:
  - o [User Guide CMSC 495 Capstone Link Here]





1. Information

2. Tic-Tac-Toe

(3. Trivia)

4. Breakout

5. Exit







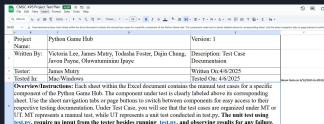
## Project Evaluation, Test Plan, and Results:

Finalized manual and automated test plans (includes GitHub Actions), we were able to identify and fix all major issues before deployment and passed the tests.



- Unit 4: Phase 1 Source Report Plan
- Tests: 13 unit tests (old test.py, main branch) no GitHub Actions.
- Overview: Covers early development and core game implementations (Mainmenu, TicTacToe, Breakout, Trivia).
  - [Google Drive (Docx) Link]
  - [GitHub (doc) Link]
- Unit 5: Testing Plan
- Tests: 20 manual test cases (Excel), 24 unit tests (new test.py, James branch), 6 GitHub Actions.
- Overview: Full validation of features and behavior, including Trivia.py and Questions.json accuracy.
  - [Google Drive (Docx) Link]
  - [GitHub (doc) Link]
- Unit 6: Phase 2 Source Report Plan
- Tests: Same as Unit 5, plus 2 GitHub Actions to verify all core files exist for deployment.
- Overview: Final features, bug fixes, test reruns, and full documentation (README, comments).
  - [Google Drive (Docx) Link]
  - [GitHub (doc) Link]
- Unit 7: User Guide
- Overview: End-user instructions for setup and gameplay. Includes game rules, navigation, and GitHub links.
  - [Google Drive (Docx) Link]
  - [GitHub (doc) Link]
- Unit 8: Deployment Report
- Overview: Final packaging of all files, documentation, and submission materials. Includes peer review prep.
- Presentation: Google Slides video/ppt summarizing all phases and key outcomes.
  - [Google Drive (Docx) Link]
  - [GitHub (doc) Link] (Check it at the GitHub repository doc folder!)
  - [Google Slides Link] (Check it at the GitHub repository doc folder or the Unit 8 discussion!)
     [PythonGameHub GitHub Repo Link]





## Design and Alternate Designs:

Our Python Game Hub followed a modular, object-oriented design using the Waterfall model.



<u>Phase 1</u> established the core architecture—Main Menu, Tic-Tac-Toe, Trivia, and Breakout—along with early unit tests and GitHub version control.

<u>Phase 2</u> finalized the application with 24+ unit tests, GitHub Actions CI/CD, full manual testing, and optimized gameplay and UI.

All features were validated for performance, usability, and reliability.

Phase 1 Report
Phase 2 Report



## Project timeline Image 1



CMSC495: Python Game Hub - Detailed Basic Gantt Chart Victoria Lee Members: Mutry, James; Foster, Todasha; Chung, Dajin; Payne, Javon; Ipaye, Oluwatumininu Input column Project start date: 10-Mar-25 Calculated column APRIL MAY MARCH **WEEK 11 WEEK 12 WEEK 13 WEEK 14 WEEK 15 WEEK 16 WEEK 17 WEEK 18 WEEK 19** 03-Apr-25 27-Mar-25 02-Apr-25 07-Apr-25 1-Apr-25 4-Apr-25 5-Apr-25 7-Apr-25 21-Apr-25 WORK **END** Unit # Tasks per week START DATE DATE 03/14/2025 Unit 1 - Team Formation 03/10/2025 Unit 2 - Project Plan/Code 03/15/2025 03/18/2025 Unit 3 - Project Plan/Code 03/18/2025 03/28/2025 Unit 4 - Phase 1 / Code 03/28/2025 04/04/2025 Unit 5 - Test Plan 04/04/2025 04/11/2025 04/18/2025 Unit 6 - Phase 2 / Code 04/11/2025 Unit 7 - User Guide 04/18/2025 04/25/2025 Unit 8 - Final Report 04/25/2025 05/02/2025

### Development History (Project Timeline) and Deployment:



### Timeline for Project:

1	Unit 1 - Team Formation	03/10/2025	10	03/14/2025
2	Unit 2 - Project Plan/Code	03/15/2025	3	03/18/2025
3	Unit 3 - Project Plan/Code	03/18/2025	9	03/28/2025
4	Unit 4 - Phase 1 / Code	03/28/2025	6	04/04/2025
5	Unit 5 - Test Plan	04/04/2025	6	04/11/2025
6	Unit 6 - Phase 2 / Code	04/11/2025	6	04/18/2025
7	Unit 7 - User Guide	04/18/2025	6	04/25/2025
8	Unit 8 - Final Report	04/25/2025	6	05/02/2025

### **▲ Python Game Hub must be Publicly Accessed on GitHub:**

- GitHub Repository:
- [CMSC495Capstone-Python Game Hub]
  - Read the <u>README.md</u> OR <u>User Guide</u>

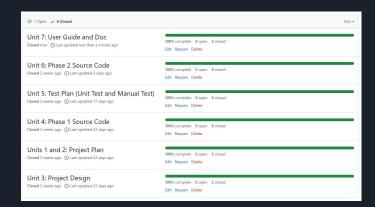
#### Project Timeline (based on updates[Phases 1 & 2]):

- Unit 2: Project Plan
  - [Google Drive (Docx) Link]
  - [GitHub (doc) Link]
- Unit 3: Project Design Plan
  - [Google Drive (Docx) Link]
  - [GitHub (doc) Link]
- Unit 4: Phase 1 Source Report Plan
  - [Google Drive (Docx) Link]
  - [GitHub (doc) Link]
- Unit 5: Testing Plan
  - [Google Drive (Docx) Link]
  - [GitHub (doc) Link]
- Unit 6: Phase 2 Source Report Plan
  - [Google Drive (Docx) Link]
    - [GitHub (doc) Link]
- Unit 7: User Guide
  - [Google Drive (Docx) Link]
  - [GitHub (doc) Link]
- Unit 8: Deployment Report
  - [Google Drive (Docx) Link]
  - [GitHub (doc) Link][Google Slides Link]
  - (Refer to GitHub Repo for those links)
  - [PythonGameHub GitHub Repo Link]

## Project timeline Expansion Explanation

Refer to <u>Unit 4. Unit 6. and Unit 8</u> to compare the project timelines, job contributions, Git (Version Control), Testing, and Changes to the Project Management sections.

- Unit 6: Phase 2 Source Report Plan
  - o [Google Drive (Docx) Link]
  - o [GitHub (doc) Link]
- Unit 7: User Guide
  - o [Google Drive (Docx) Link]
  - o [GitHub (doc) Link]
- Unit 8: Deployment Report
  - o [Google Drive (Docx) Link]
  - o [GitHub (doc) Link and Slides]
  - (At GitHub repository "doc")



[PythonGameHub GitHub Repo Link]

It is crucial to view the APPENDIX sections:

- The testing and Git version control processes are further detailed in APPENDIX D and APPENDIX E. The Milestones and Gantt chart updates with the Contribution Report are in APPENDIX A, APPENDIX B, and APPENDIX E.
- A shows the overall timeline due dates and how our progress compares with units 1-8. B shows the breakdown of each task/milestones completed and costs.
- APPENDIX C is referring to the delays and emergencies so far to push back the code.
- APPENDIX E shows the breakdown of the Git issues/milestones completed for that week (screenshots).



Figure: This image below represents the project timeline plans for our team using the SDLC waterfall method



## Discussion



Throughout this project, we learned the value of strong modular design, clear documentation, and regular testing. One of our strengths was creating a smooth and unified player experience across different games.

However, some limitations included challenges with cross-platform testing and limited mobile compatibility.

For the future, we suggest adding database support, expanding automated testing, and improving UI responsiveness. Overall, this project taught us that solid planning, communication, and teamwork are essential to delivering a polished and maintainable software product.



## Conclusion



- Successfully delivered a modular Python game hub with three mini-games
- Followed the SDLC Waterfall Model across eight project units
- Combined automated and manual testing to ensure a bug-free deployment
- Used GitHub for version control and implemented CI/CD via GitHu Actions
- Learned collaboration, version control, task ownership, and technical writing
- Ready for public GitHub release and future scalability







## Acknowledgements



**Victoria Lee** (<u>GitHub: VictoriaRaven</u>): As a Project Manager / Technical Writer / Tester (GitHub Actions / Repo), I want to express my deepest gratitude to my amazing team for their unwavering dedication and hard work throughout this project. The way we came together, blending our skills, strengths, commitment, and teamwork like in the *Avengers*, Marvel movie, made this experience truly special (Whedon, 2012). I also want to extend a heartfelt thank you to my peers and family, whose suggestions helped shape the final product. Your support, both on and off the project, was invaluable and truly appreciated. Thank you and as always, "Not all treasure is silver and gold, mate." -Captain Jack Sparrow (Pirates of the Caribbean) (Verbinski, 2003).

James Mutry (GitHub: jamesmutry): As a Technical Writer / Tester (Unit Tests & Manual Tests), I would like to take this opportunity to sincerely thank my entire team for their dedication, hard work, and collaboration throughout the Python Game Hub project. Each member brought their own unique skills and strengths, contributing to the success of this challenging and rewarding experience. From initial planning to final deployment, our team consistently supported one another, tackled obstacles together, and maintained a strong commitment to producing a polished and functional final product. I am especially grateful for the positive attitude, adaptability, and professionalism that everyone demonstrated during each phase of the project. Working alongside such a talented and motivated group made this capstone experience not only educational but truly enjoyable. I am proud of what we accomplished together and thankful to have had the opportunity to collaborate with such an outstanding team.

**Javon Payne** (<u>GitHub: javonpayne100</u>): As a Git Lead (.py files) / Developer (MainMenu & Trivia) / Sub Tester), I want to give a huge thanks to my team for bringing me on board with open arms. It's a blessing to have a team with diverse skills, restless drive, and great character. This experience has definitely taught me a lot and this type of camaraderie should be the standard of many development teams. I want to especially thank Victoria; her organization skills and leadership is unmatched. Congratulations everyone, graduation is here! "May the force be with you." - Yoda

## Acknowledgements (Continued)

**Todasha Foster** (<u>GitHub: DayFoster123</u>): As a Developer (Breakout) / Sub Tester, I would like to express my sincere appreciation to my team members for their energy, creativity, and collaboration throughout this project. Contributing as a developer was a rewarding experience that allowed me to strengthen my skills and grow professionally. I am proud of the challenges we overcame together and the final products we created. This achievement reflects the passion, effort, and dedication of every member of the team. "I never dreamed about success. I worked for it." – Estée Lauder

**Dajin Chung** (GitHub: dajinchung): As a Developer (TicTacToe) / Sub Tester, I'd like to thank my entire team for their hard work and collaboration throughout this project. Each member contributed their strengths, from development and testing to design and documentation, to bring this project to life. A special thanks to Victoria, who truly stepped up as project manager. Her organization, communication, and consistent support helped keep our team focused and on track. We would not have reached this level of polish and completion without her leadership. Everybody, thank you for all your hard work. As a wise ogre once said, "That'll do Donkey. That'll do." - Shrek

Oluwatumininu Ipaye (<u>GitHub: tumiwiththewave</u>): As a Developer (Breakout) / Sub Tester, I want to express my deepest gratitude to the entire team for their hard work and resilience to get this project done. I have been able to learn a lot from each single member and effectively learnt how to work in a group setting such as this. My skills have been boosted and challenged at the same time, which shows that being a coder/programmer is a never ending lesson. I would like to specially thank Victoria Lee, as she was the backbone of this entire project and ensured everything went smoothly and without any hitches. I am proud of what we were able to accomplish in a short period, and wish you all the best ahead. *The sky's the limit*.

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#### • Unit 8: Deployment Report

- [Google Drive (Docx) Link]
- [GitHub (doc) Link] (Check it at the GitHub repository doc folder!)
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## Appendix



- Unit 8: Deployment Report
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# -Thank you!