Project Thor

Team Members:

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Faculty Advisor:

Name	**Email**
Sid Bhattacharyya	sbhattacharyya@fit.edu

Client:

Name	**Email**
Amitabh Nag - Aerospace, Physics and Space Sciences	anag@fit.edu

Current Progress of Milestone 1

Task	Progress	Adonay	Jared	Josh	Luke	To Do
1. Compare and select technical tools	100%	30%	10%	30%	30%	None
2. “Hello world” demos	100%	Small presentation showing the entropy found thus far	Small presentation showing the entropy found thus far	Entering raw data to database	Showing connection from website to database working	None
3. Resolve technical challenges	55%	5%	15%	10%	25%	Continue exploring the data set and setting up the web application
4. Compare and select collaboration tools	100%	25%	25%	25%	25%	None
5. Requirement document	100%	Wrote 25%	Wrote 25%	Wrote 25%	Wrote 25%	None
6. Design document	100%	Review & Proofread	Wrote 10% Review & Proofread	Wrote 50%	Wrote 40%	None
7. Test plan	100%	Wrote 15%	Wrote 20% Review & Proofread	Wrote 30%	Wrote 35%	None

5. Discussion - Accomplishments

1. Task 1: Selecting technical tools
   For the backend, we are looked at many cloud-based environments. After talking with our faculty advisor, we decided to continue with a local server environment. The frontend tool we selected was changed to PHP as we are hosting our backend environment locally. We decided to choose MySQL instead over the alternatives of PostgreSQL and MS SQL server. We also chose to continue with MD5 as our initial algorithm implementation for our encryption keys. We plan to support more algorithms in the future if MD5 is proven to be successful.
2. Task 2: Demos
   We had 3 demos for the ‘Hello World’ milestone. The first was importing data into the database. The second was to display data from the database to a website to prove the functionality between the server and website. The third was to explore the entropy found in the data set so far.
3. Task 3: Resolve Technical Challenges
   We resolved 3 of 4 technical challenges. We created the server environment for our application, setup the database and added test data, and found a key generating algorithm to implement. Exploring the entropy of the data set is an ongoing task that will parallel the project to the end. We can continuously update our dataset to adjust and evaluate the entropy.
4. Task 4: Selecting Collaboration Tools
   The tools we selected for collaborative development are GitHub for software development, Google Drive for documents, discord for communication, and GitHub projects for task management.
5. Task 5: Requirement Document
   The requirements document defines the features and functions of Project Thor. The requirements are specific and measurable and are built to be referenced as we continue working on the project. The requirements document is to define how our project will function to meet the goal of generating a key and allowing users to understand how the key was made.
6. Task 6: Design Document
   The design document encapsulates the system architecture and GUI interfaces of the project. The design document includes UML diagrams, use case diagrams, database designs, website page mockups, and the system architecture diagram.
7. Task 7: Test Plan
   The test plan ensures the requirements of the project are met. They also serve as a progress and correctness measure. As each test case is passed, we are closer and closer to completing our requirements and goal for the project. The inputs and outputs of each feature and function are provided as well as the execution steps of how to perform each test. Tests were created from a user perspective.

6. Discussion - Contributions

<each task item>

1. Luke Bonenberger: Investigated backend, frontend, and database tools, and project website designs. Setup GitHub project board, database design. Developed class project website and Project Thor website. Contributed to requirements, design, test, and evaluation documents. Contributed to System architecture diagrams, use case diagrams, and website mockups.

2. Jared Blanco: Developed a format for the ASCII data to be further broken down and parsed by familiar python libraries for further automation, researched algorithms that demonstrate entropy through our data set with the help of Dr. White, analyzed the data and developed visuals to present entropy in the data, developed a python script taking in our phenomenon generated numbers to generate the MD5 hash. Contributed to requirements document, test document, front end design ideas, and system architecture ideas.

3. Josh Temel: Set up a local server on a raspberry pi to host the web server and database (temporarily until the team can obtain a school provided raspberry pi), Wrote and formatted large parts of the requirements, design, and test documents, created the google drive for the team to store the live project documentation while it's in development.

4. Adonay Pichardo: Selected MD5 for initial encryption algorithm, researched entropy measuring tools, created git repository for team, initiated requirements writing, reviewed and approved Design Document, provided hardware and software for SSH network configuration.

7. Milestone 2 Plan

Task	Adonay	Jared	Josh	Luke
Update "Hello World" demos to better reflect the projects current status	Update data set demo 25%	Update data set demo 25%	Update database demo 25%	Update web application demo 25%
Update project documentation to reflect any new changes.	Read and review edits	Read and review edits	Update 100%	Read and review edits
Work on getting a school supplied raspberry pi and set up the local server on that	Work with Josh to set up server 50%	None	Work with dr sid to obtain hardware. Work with Adonay to set up 50%	None

Implement an automation script that transfers the data from the ASCII file.	Offer help / troubleshoot	Offer help / troubleshoot	Create and implement 50%	Offer help / troubleshoot 50%
Complete at least 25% of the web application in terms of design layout. Content will come later	Read and review	Read and review	Work on 50%	Work on 50%
Show current entropy findings of the data and have an idea of how it will be measured and presented on the web application	Work on 50%	Work on 50%	Offer help / troubleshoot	Offer help / troubleshoot
Have a script in place that at the very least takes data from the lightning table of the database, performs a calculation, and inserts the result into the key table.	Work on 50%	Work on 50%	Offer help / troubleshoot	Offer help / troubleshoot

8. Discussion & Lessons Learned

Task 1: Selecting technical tools

Lessons learned when developing the backend derived heavily from the implementation and utilization of a group member hosting a local server off campus. This included setbacks such as the IP not being accessible without support of the internet provider. The primary lesson learned in the context of hosting our own database is steps that need to be taken in order to have connectivity be available to all group members

Task 2: Demos

With a demonstration of entropy comes the heavy dependency on the definition of randomness. As true randomness is almost impossible to prove we found ourselves needing to take in additional help from the math department. The primary lessons

learned here was to never underestimate proving entropy as well as always being willing to take in help outside of your direct organization.

Task 3: Resolve Technical Challenges

On a technical level, less challenges were encountered as the project was fairly split with website development, database development, entropy research, and website hosting all being majoly completed. All lessons learned from these challenges are to continue to have assigned tasks throughout the group and assist other team members when needed

Task 4: Selecting Collaboration Tools

With the selection of these tools such as Github, Google drive, and discord, the only lesson learned is to not reinvent the wheel. As a group we are utilizing tools we are all familiar with in order to optimize time and performance throughout.

Task 5: Requirement Document

With the development of the requirements document, our team got tripped up slightly with the not shared understanding of how requirements should be written. Once Josh explained and demonstrated the writing of SMART (Specific, Measurable, Achievable, Realistic, and Timely) requirements, the team began to more effectively communicate and complete these tasks. In conclusion, sharing knowledge and establishing standards before tackling a task is an important lesson.

Task 6: Design Document

The development of graphics that were included such as the UML diagrams, use case diagrams, database designs, website page mockups, and the system architecture diagram went very well. This was in large due to the team all being on the same page about how these tasks needed to be developed.

Task 7: Test Plan

The test plan, due to the entire group's understanding of the requirements and design document went very well. As this is the document that is needed to demonstrate the progress and completion of the project, this being a focus point for our group's discussions is a great lesson learned.

9. Date(s) of Meeting(s) with Client:

Date	**Topic**
September 3, 2021	● Better understanding the dataset

10. Client feedback of current milestone

1. Dr. Nag advised us to focus on the development of the encryption key with a finite set of lightning data. He tasked us with selecting certain attributes of data that are different from each lightning strike.

11. Dates of Meeting with Faculty Advisor

Date	**Topic**
September 3, 2021	Better understanding the dataset
September 7, 2021	Direction of project
September 28, 2021	Reviewed documents for edits

12. Faculty Advisor Feedback for Milestone 1

1. Task 1:
   Dr. Sid recommends we chose a locally hosted server option and that we host it on a raspberry pi. The benefit to this is that we can focus our efforts on proving the concept. Another benefit is that this project could physically be handed off to the next group, if applicable. Additionally, Dr. Sid recommended we select a single encryption algorithm to prove the concept. If we are able to succeed in using one algorithm, we would be able to implement more of them.
2. Task 2:
   Dr. Sid recommended we build in the capability to automate real-time data into the database in the future.
3. Task 3:
   Dr. Sid recommended we communicate with Dr. White, from the mathematics department, to explore and prove the entropy of the lightning attributes dataset from Dr. Nag. Dr. White helped us find algorithms to prove the entropy of our dataset that we will continue to work on for Milestone 2.
4. Task 4:
   No feedback.
5. Task 5:
   Dr. Sid gave us insight into the difference between functional and non-functional requirements regarding performance. This was confusing in our document and we clarified that the performance requirements are considered non-functional. Additionally, he wanted us to expand our requirements regarding the transferability of the project. Our project needs to be able to be portable, and build that way, in the event we need to pass on the project to a new group. Also, Dr. Sid suggested we specific that our project can adapt to incorporate live updates from the lightning data ASCII file to our database as a future capability.
6. Task 6:
   No recommendations as of 9/28/2021.
7. Task 7:
   a. No feedback.

13. Approval from Faculty Advisor

"I have discussed with the team and approve this project plan. I will evaluate the progress and assign a grade for each of the three milestones."

Signature: _____ Date: _____

1. Evaluation by Faculty Advisor
    - Faculty Advisor: detach and return this page to Dr. Chan (HC 214) or email the scores to pkc@cs.fit.edu
    - Score (0-10) for each member: circle a score (or circle two adjacent scores for .25 or write down a real number between 0 and 10)

Adonay	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Jared	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Josh	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Luke	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10

Facutly Advisor Signature: _____ Date: _____