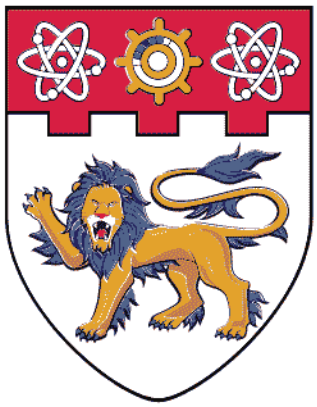

NANYANG TECHNOLOGICAL UNIVERSITY
SINGAPORE

Drawdiculous

Project Proposal

Version 1.0

Prepared by Team Luck

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Table of Contents

1. Executive Summary

Currently, the elderly comprise about 14% of Singapore's total population [1]. Due to the increase in life expectancy and low birth rates, this number is projected to grow to 25% by 2030 [1]. There have therefore been various healthy ageing initiatives and digital literacy initiatives in recent years to improve the overall wellbeing of Singapore's aging population and help them stay more connected with their loved ones.

Our team intends to develop a mobile application that caters to the social and cognitive needs of the elderly through a social drawing game. The proposed application, "Drawdiculous", will contain an initial function that allows the users to either "Create Room" or "Join Room" to start gameplay with their friends. Following setup, a single participant in the game room will be given a prompt to draw and the rest of the participants will guess what the "artist" is drawing. The roles will switch after the completion of each round, in order to give each of the participants a chance to draw. Players will be awarded points based on the speed in which they submit the correct answer.

This game will be developed specifically with the requirements of the elderly user base in mind. The user interface will also be intuitive and minimalistic, so as to not overwhelm users.

The total budget for initial design for the proposed project is $174,545.44. This amount covers the salary of all team members, the fee of necessary equipment, technology costs, and other miscellaneous costs. The mobile application development will involve a team of six developers and managers with a diverse skill set.

2. Statement of Problem

“Memory is the diary that we all carry about with us”. This remark made by renowned author Oscar Wilde clearly accentuates the main idea that our product will drive at - Elderly can prevent memory impairment or risk of dementia through cognitive training. It is mentioned that “In fact, one in nine Americans aged 45 and older say they are experiencing thinking declines [2]. According to the U.S. Centers for Disease Control and Prevention, noticing a decline in your mental abilities ("cognitive decline") is one of the earliest signs of impending Alzheimer's disease or dementia.. ” [2]. The WiSE study found that the prevalence of dementia was 10% in the elderly population i.e. those aged 60 years and above in Singapore (using the 10/66 dementia criteria) [3] . Hence, we are in a situation to solve this problem by stimulating their thinking through a memory game. Research proves that cognitive training slows down the cognitive declines associated with ageing, helps older adults remain more independent as well as sharpens mental skills needed in daily life [4].

Recent innovations in the form of advanced cognitive training tools and games have opened the floodgates for elderly to train their memory. However, interactive (multiplayer modes) and easy-to-use tools such as drawing games seem to have taken a backseat today. Thus, it is necessary that these interactive games are created so that it can provide an enjoyable time for the elderly as well as to sharpen their memory.

3. Objectives

This document proposes 3 main design objectives.

1. Interactive Nature
2. Relatable and Familiar Words
3. Minimalist interface

1 - Interactive nature

The design should ensure that it is as interactive as possible and that up to 6 people can participate in a private room at one time. It is essential for our game to be interactive as it would guarantee a more enjoyable experience for the elderly players. The enjoyable experience will also serve as a motivation for elderly to participate and thus achieve our purpose fully of providing cognitive training for elderly. To ensure that the game runs smoothly, the game has to function efficiently in real-time conditions. We would also ensure a minimum refresh rate of 20Hz.

2 - Relatable and familiar words

The main purpose of this game is to test elderly's memory and ensure that they are able to recall it efficiently. To do so, we will structure and choose the questions such that it can remind elderly of their memories. With our specially chosen questions, our cognitive training drawing game will be able to assist elderly in recalling their memories. In addition, we will ensure that there are at least 1000 unique words to decrease the chance of elderly encountering words repeatedly.

3 - Minimalist interface

Elderly are generally less proficient in using mobile applications due to lack of experience. Therefore, it is crucial to have a design layout that is easy to understand to avoid confusion while playing. This allows the elderly to focus purely on enjoying the game. To achieve a minimalist design, we will design our user interface based on the Shneiderman's Eight Golden Rules.

4. Technical Approach

In order to achieve the stated objectives, our team has decided to first identify the requirements of our targeted users. Followed by discussing the specifications needed to fulfill the needs of the customers, as well as the technologies and architectures we will be using to develop the application.

4.1. Customer Needs

Singapore is facing an aging population. As we age, we face degeneration not just physically, but mentally as well. However, research has shown that cognitive declination can be slowed through activities that stimulate the brain. Examples include drawing, which improves memory.

There are also other factors that exacerbate mental decline, such as loneliness. When an elderly lives in isolation, their cognitive function declines rapidly, which leads to conditions from disrupted sleeping to depression and Alzheimer's.

In conclusion, there is a need for a tool that is able to connect seniors with each other, while training their cognitive capabilities.

After careful consideration, a mobile application was chosen as our tool of choice. This is in accordance with Singapore's Mobile Access for Seniors scheme, which provides subsidised smartphones and mobile plans to lower-income seniors. [5] Hence, compared to web applications which require computers, a mobile application is much more accessible and thus able to provide greater improvement to elderlies' quality of life.

As seniors are usually less experienced with technology, the mobile application must be elderly-friendly.

4.2. Target Specifications

"Drawdiculous" will have two options: "Create Room" and "Join Room". When creating rooms, the room creator can choose to set a room password, making the room a private room, or leave the room password text box empty, making the room a public room. After creating the room, the user will be sent to an empty game lobby, each with its unique room ID. Players can choose to join a random public room by clicking the "Join Random Room" button. The player can also choose to join a specific room by clicking the "Join Room" button, if the room is a private room, the player must enter the correct password to join the room. This feature enables the players to play with their friends, whom they may not be able to meet physically. Players with smaller social circles will also be able to

meet others through the random room feature. This specification thus encourages the elderly to be more socially active and interact with others that they may not know previously.

"Drawdiculous" will prompt the first player (drawer only) with a word, such as "Fireman". The drawer will draw the word from their memory. As the first player draws, the drawing will be displayed on the other player's phone in real-time, and they will guess what word the drawing is trying to represent. Players will be awarded based on the speed of getting the correct answer. By drawing the prompt from memory, players recall their memory and utilize their retrospective memory. Players also exercise problem solving analytic skills by deducing the meaning of the drawings. This specification trains the brains of the players, which slows the rate of mental declination in the elderly.

4.3. Technology Consideration

The following technologies were chosen in order to create an application that has good usability and is elderly-friendly.

Table 1: *Technologies used for Drawdiculous*

Name	**Component**	**Description**
Android Studio	Main Integrated Development Environment software	Android Studio is the integrated development environment (IDE) for Google's Android operating system.
IntelliJ IDEA	Backend IDE	JetBrains IntelliJ IDEA is the IDE developed by JetBrains for Java Programming.
Firebase	User authentication	Firebase is a platform developed by Google for creating mobile and web applications. Firebase Authentication provides backend services, SDKs and UI libraries to enable user authentication.

4.4. System Architecture/Platform

To ensure easy collaboration among our team members and prevent accidentally compromising other team member's work, we will be using Github for version control. Github is an open-source repository hosting service for programmers to collaboratively work on code, by keeping track of all changes made to every iteration.

Jira Software will be used to keep track of the lab deliverables that need to be completed. Jira is a powerful work management tool for all kinds of use cases, from requirements and test case management to agile software development.

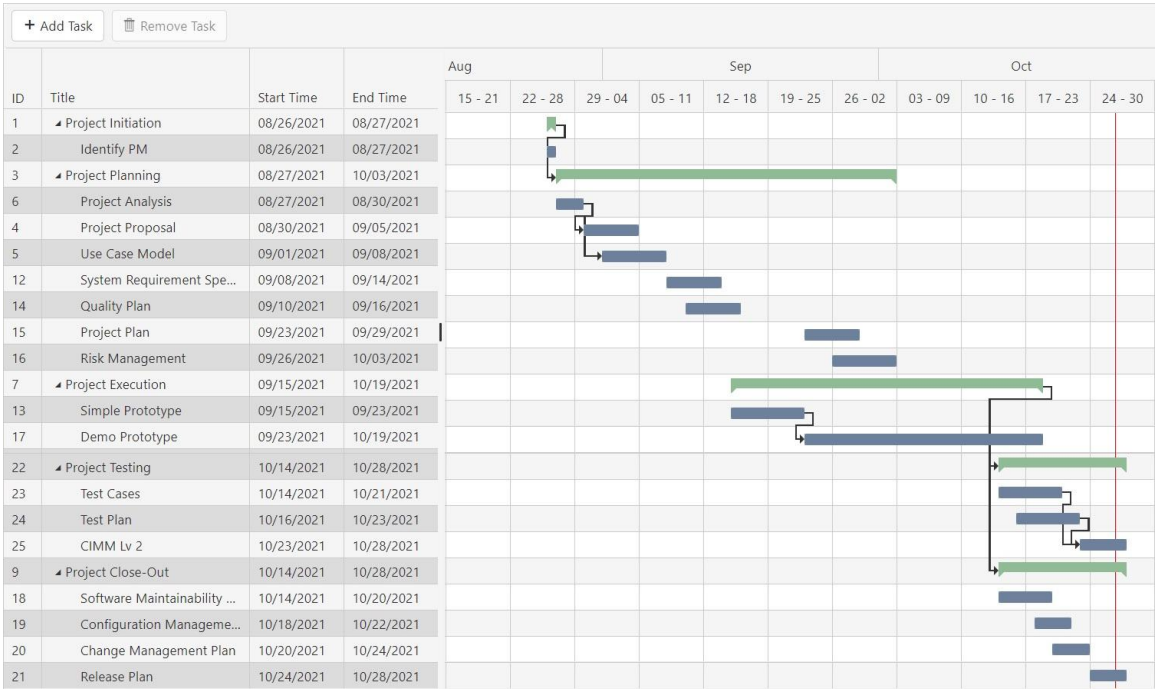
Our system will make use of the layered architecture. There will be three layers in this architecture, with each layer performing a specific role in the application:

1. Presentation layer - handles all user interface and communication logic such as
    a. Drawing screen
    b. Game room display
2. Business layer - contains business logic such as
    a. Real-time update of drawing data
3. Database layer - where all data is stored such as
    a. Prompts
    b. User profiles

Using the layered architectural design ensures separation of concerns, as components within a certain layer only deal with the logic that pertains to that layer. This is beneficial as each layer can be tested separately. Also, layered architecture modularizes our code, making our code readable application easy to maintain.

5. Project Management

There will be mainly five phases for our project, Project Initiation, Project Planning, Project Execution, Project Testing and Project Close-Out. We divide our phases into very detailed subtasks with detailed start and end time to ensure that our project is well managed.



ID	Title	Start Time	End Time
1	Project Initiation	08/26/2021	08/27/2021
2	Identify PM	08/26/2021	08/27/2021
3	Project Planning	08/27/2021	10/03/2021
6	Project Analysis	08/27/2021	08/30/2021
4	Project Proposal	08/30/2021	09/05/2021
5	Use Case Model	09/01/2021	09/08/2021
12	System Requirement Spe...	09/08/2021	09/14/2021
14	Quality Plan	09/10/2021	09/16/2021
15	Project Plan	09/23/2021	09/29/2021
16	Risk Management	09/26/2021	10/03/2021
7	Project Execution	09/15/2021	10/19/2021
13	Simple Prototype	09/15/2021	09/23/2021
17	Demo Prototype	09/23/2021	10/19/2021
22	Project Testing	10/14/2021	10/28/2021
23	Test Cases	10/14/2021	10/21/2021
24	Test Plan	10/16/2021	10/23/2021
25	CIMM Lv 2	10/23/2021	10/28/2021
9	Project Close-Out	10/14/2021	10/28/2021
18	Software Maintainability ...	10/14/2021	10/20/2021
19	Configuration Manageme...	10/18/2021	10/22/2021
20	Change Management Plan	10/20/2021	10/24/2021
21	Release Plan	10/24/2021	10/28/2021

Figure 1: Gantt chart for the project. The solid bars indicate the portions of the tasks that we have accomplished. Go to Gantt Chart.png for a clearer image.

5.1. Deliverables

We will write and maintain a list of documents to make sure that project requirements are fulfilled and to establish traceability concerning what has been done. While we are always maintaining a project backlog and our meeting records, other deliverables and their approximate deadline are listed below.

Table 2: *Project deliverables and deadlines*

Deadline	**Deliverables**
09/Sep/2021	Project proposal, use case model
23/Sep/2021	System requirement specification, quality plan

14/Oct/2021	Project plan, risk management
28/Oct/2021	Entire system, design report on software maintainability, configuration management plan, change management plan, release plan, test plan and test cases
31/Oct/2021	User-friendly instructions

5.2. Budget

The total budget for initial design for our project is $174,545,44. This amount includes: the salary of all team members, the fee of necessary equipment, technology costs, and some other costs. The cost is exclusive of any maintenance cost, i.e. server maintenance, of the project after the development cycle.

Table 3: *Requested items and funds for initial design*

Item	**Supplier**	**Quantity**	**Unit Price**	**Total**
Personnel				
Project Manager		1*4	$10,000.00	**$40,000.00**
Project team members		5*4	$6,000.00	**$120,000.00**
Equipment				
Computers	Lenovo	6	$1,599.00	**$9,594.00**
Technologies				
Technology license	JetBrains	1	$649.00	**$649.00**
Technology license	Visual Paradigm	1	$1,999.00	**$1,999.00**
Server	NTU	4	$75.86	**$303.44**
Others				
Stationery		1	$1,000.00	**$1,000.00**
Transportation	Taxi	1	$1,000.00	**$1,000.00**
			TOTAL	**$174,545.44**

5.3. Communication and Coordination with Sponsor

Meetings with sponsors and clients will be disseminated every Thursday evening. Due to COVID-19 pandemic, online Zoom conferences will be held instead of face-to-face meetings. Our QA manager will present on our weekly progress, and answer some technical questions. Meanwhile, our lead developer would record any possible defects and updated requirements during the meeting to ensure that the app is correctly built. After the meeting, a report containing detailed weekly progress and meeting content is delivered to sponsors and clients by our project manager.

The release manager is in charge of contacting our sponsors and clients. She records all communication and updates relevant team members to ensure efficient and accurate communications. Specifically, when she updates deliverables to sponsors, the document would be sent via email. In cases when we need a reply from our sponsors, for example, when we request for funds, our release manager would visit the sponsors for more efficient communication.

5.4. Team Qualifications

We have a strong and experienced team of six NTU Computer Science major students that are qualified to develop a high-quality product and a lot more.

Bian Hengwei, the project manager, has been programming for over three years. He has plenty of experience in Android Development. He developed an Android App for the China National Skiing Team in 2021. Moreover, Bian is qualified as a project manager with experiences of leading 3 successful software development course projects in the past 2 years.

He Yinan, the backend developer, has been backend developer for 3 software development projects. She is familiar with data structures and algorithms, operating systems, and database knowledge. Furthermore, He Yinan is experienced with working on Linux servers, version control, and backend frameworks.

Jin Han is experienced in front-end development, having developed various mobile applications using platforms such as Android Studio. She has previously worked with companies such as Visa, where she was able to translate business requirements and user interface designs into high-quality code. With her programming proficiency and critical thinking skills, she is suitable to lead our team's front-end development.

Renganathan Ramasamy has experience in developing Mobile Applications for different uses. For instance, one of the projects was where he built a Mobile Highlighter Application for News Media Companies such as Straits Times which allows users to highlight their favorite portions of the news article and to save them. More applications such as a Dengue Alert Application are part of his portfolio as well. He will be a valuable asset to the team.

Melvin has experience in developing various web applications as well as mobile applications. He has also previously worked with companies in configuring and testing web servers and network connectivity. With the past experiences in testing and proficiency in programming, he is able to test and resolve found issues in the programme before launching to application.

Shipra, the release engineer/manager, has extensive experience with mobile application and game development, and has been a frontend android engineer and unity game developer in various academic projects. Her previous work experience cements her proficiency in software development, version control, as well as issue and product tracking (using JIRA). Her technical ability and experience with the software development life cycle and product release makes her well-suited for the team.

6. Conclusion

In closing, we intend to create a mobile application that allows its elderly users to improve drawing ability, stimulate cognitive capacity and improve motor function through practice in a game setting.

The number of Singapore residents aged 65 years and above who live alone has increased from 47,000 in 2016 to 67,600 in 2019 [6]. According to the Singapore Longitudinal Ageing Study published in 2015 by the National University of Singapore's Yong Loo Lin School of Medicine [7], seniors living alone and feeling isolated were twice as likely as their peers to develop depressive symptoms as a result of loneliness. Social isolation in the elderly is therefore a growing concern. Our proposed application's social feature is designed to promote communication in order to effectively reduce feelings of isolation and bolster the user's sense of well-being. A supplementary benefit of this feature is the competitive element which is designed to provide an additional incentive for certain individuals.

The proposed application will be developed within the aforementioned timeframe with rigorous quality control measures. It shall be intuitive, easy-to-use and personalise, responsive and effective, in order to cater to the needs of our target audience.

7. References

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8. Appendix A:

Résumés of Team Members

The following pages present one-page résumés of the team members for this project.

BIAN Hengwei

HP: +65 82186187 | Email: HBIAN001@e.ntu.edu.sg

EDUCATION

Nanyang Technological University, Singapore **2019.08 - 2023.07 (Expected)**

- **Bachelor of Engineering (Computer Science)**
- Expected Honours (Highest Distinction) GPA: 4.90/5.00
- Dean's List for Academic Year 2019-2020
- Relevant Modules: Software Engineering, Algorithms, Computer Network

ACADEMIC PROJECTS

SCALE@NTU & NCS Singapore, Singapore
URECA Project **2020.09-2021.06**
Title: Advanced Object Detection in Augmented and Virtual Reality (AR/VR)

- Developed object detection API based on YOLOv4 and performed training tasks on an indoor images database to enhance reliability of detection in some AR/VR settings.
- Achieved accurate real-time object detection in an indoor environment.

Nanyang Technological University, Singapore
Software Engineering Project **2021.02-2021.04**
Title: Med Check

- Developed an Android App using Google Firebase with documentations including App requirements, Use Case Diagrams, Sequence Diagrams, etc.
- Allows users to search for clinics in Singapore, book checkups or record medication schedules.

WORK EXPERIENCE

CLEAR Lab, Southern University of Science and Technology, Shenzhen, China **2021.05-2021.07**
Android Engineer, Intern

- Developed an Android App of intelligent equipment for China National Skiing Team.
- Built wireless communication between the application and a chip on the skiing board. The application gathers sensor data from the board and displays them when needed.
- Acquired proficiency of programming within parallel contexts such as network protocols, multithreading etc.

SKILLS

Languages: English (Fluent), Chinese (Native)
Programming: Python, Java, C, C++, JavaScript, Matlab, SQL

He Yinan

+65 96520505 • yinan.he.688@gmail.com

Availability period: Jan 2022 to August 2022

EDUCATION

Nanyang Technological University, Singapore **August 2019 – May 2023 (Expected)**

- **Bachelor of Engineering (Computer Science)**
- Expected Honors GPA: 4.61/5.00

ACADEMIC PROJECT

Nanyang Technological University, Singapore

Software Engineering Project **February 2021 – April 2021**

Title: MedCheck Android application

- Coordinated and developed an Android application to remind users for checkups and medications and assist user in making medical appointments.
- Developed using Java and Firebase and implemented layered architecture to allow easy collaboration between team members and support reuse of lower layers.

Object Oriented Design and Programming Project **October 2020 – November 2020**

Title: My Student Automated Registration System (MySTARS)

- Developed a course registration application for university students to add, drop, swap, and check courses and course administrators to add and edit courses.
- Used Java as programming language and applied Object Oriented Programming for reusability and easy code maintenance.

WORK EXPERIENCE

REC Solar

Automation of HR OJT documents (NTU Edge project) **May 2021– August 2021**

- Collaborated with HR staff from REC Solar Pte Ltd to automate the On-Job-Training process from using hard copy assessment sheet into online version in tablet application.
- Used Microsoft Power Apps to design and build a fully functional application that allow trainer to assess trainee using tablet and automatically backup assessment results to SharePoint.

RESEARCH EXPERIENCE

Undergraduate Research Experience On Campus (URECA) **August 2021– July 2022 (Expected)**

- Self-Tuning Big Data Processing.
- Aims to design adaptive data structures that suit big data applications.

CO-CURRICULAR ACTIVITIES

Welfare Service Club (Friends of Children) **September 2019 – present**

- Volunteers weekly at Clementi Community Centre to provide mentoring sessions for children (4 to 17 years old) from lower income families.
- Participated in organization of December Event 2019.

SKILLS

Languages: Proficient in English and Chinese

Technical Skills

- **Programming:** Java, Python, C, SQL, JavaScript, HTML
- **Development environment:** Android Studio, Visual Studio Code, PyCharm
- **Machine learning:** Regression, Clustering, Decision Tree, Random Forest, Neural Network

JIN Han | Mobile No.: 9651 7692 | Email: jinhan1179@gmail.com

EDUCATION

Nanyang Technological University, Singapore Aug 2019 – Present
Bachelor of Engineering (Computer Science)
- Expected Honours (Distinction)

Hwa Chong Junior College, Singapore Jan 2017 – Dec 2018

ACADEMIC PROJECT

Nanyang Technological University, Singapore Aug 2020 – Aug 2021
URECA Project – Virtual Exhibition Sea Level Rise
- Developed virtual exhibition using Unreal Engine to raise awareness on effects of sea level rise.
- Self-taught C++ and Unreal Engine.
- Researched on virtual reality techniques and environmental issues.
- Programmed system to be compatible with PC/laptop and Virtual Reality equipment.

Hwa Chong Junior College, Singapore Feb 2017 – May 2018
CenTaD Project – Research on effect of loss of a protein on development of organs
- Investigated role of a protein with mentorship by research scientist and assistant at A*STAR Institute of Medical Biology.
- Presented research paper for Singapore Science and Engineering Fair 2018.
- Participated in International Researchers Club Conference on Science, Engineering and Technology (IRC-SET) 2018.

INTERNSHIP EXPERIENCE

VISA, Singapore May 2021 – Aug 2021
Software Engineer Summer Intern
- Designed front-end features that were used by VISA users
- Generated ideas and solutions as part of the development lifecycle
- Translated UI/UX designs and business requirements into high-quality code
- Collaborated with fellow interns and developers to improve the platform

WORK EXPERIENCE

- **Not Applicable**

CO-CURRICULAR ACTIVITIES

Nanyang Technological University Chinese Orchestra, Singapore Aug 2019 – Present
Member
- Performed in Esplanade Outdoor Concert on February 2020.
- Performed in Chinese Orchestra E-concert on October 2020.

Nanyang Technological University Cat Management Network, Singapore Aug 2019 – May 2020
Member
- Volunteered to foster campus cat during haze period.
- Improved campus cats' living standard through weekly feeding.

VOLUNTEER EXPERIENCE

Society for the Prevention of Cruelty to Animals, Singapore Dec 2018 – June 2019
Animal Shelter Helper
- Promoted animal health by cleaning enclosures and preparing food.
- Improved animals' wellbeing through regular positive human interaction.

SKILLS

Languages: Proficient in English and Mandarin. Basic knowledge of Japanese.
Programming Languages: Python, Java, C, Dart, MATLAB. Basic proficiency in C++ and R
Others: Microsoft Office, Unity, Unreal Engine 4, Android Studio, Flutter

Melvin LEE | Mobile No.: 9620 4678

Email: melvinleeyj@gmail.com | Linkedin: www.linkedin.com/in/melvin-lee-yu-jie

EDUCATION

Nanyang Technological University, Singapore Aug 2019 – Jul 2022 (Expected)
Bachelor of Engineering (Computer Science)

- Expected Honours (Distinction), Current CGPA: 4.30/5.00
- Relevant Modules: Advances Topic in Algorithm, Security Management

Singapore Polytechnic, Singapore Apr 2014 – Mar 2017
Diploma with Merit (Computer Engineering)

- Director's Honour Roll (2015)
- Director's Honour Roll (2017)
- Relevant Modules: Computer Networking, Internet Security

ACADEMIC PROJECT

Nanyang Technologies University, Singapore Aug 2020 – Nov 2020
Software Engineering Project – Housing Nation

- Build a website through ASP.NET which able to predict the resale price of a given housing district.
- Focus and improved the user interface and experience in using the web application.

Singapore Polytechnic, Singapore Apr 2017 – Jan 2017
Final Year Project – Build a Go-Kart using Plywood

- Lead a team of 6 with no knowledge of mechanical engineering in building a go-kart using plywood.
- Innovate ideas for a screwless go-kart.
- Understand and apply knowledges and concept to integrate electrical and mechanical engineering.
- Learnt importance of both hardware and software in current digital society.

Singapore Polytechnic, Singapore Jan 2016 – Mar 2016
Industries Coursework Project – Design/develop a mobile application prototype for V360Property Pte Ltd

- Develop a mobile application prototype for potential house buyer to view houses in 360 degree through phone.

WORK EXPERIENCE

Nested Technologies/Aural-Aid Pte Ltd Jan 2021 – May 2021
Front-end Intern

- Testing of web applications in user-interface before releasing latest patch.
- Animate illustrations and developed new methodologies in solving server-related problems.

Westermo Data Communications Pte Ltd Mar 2016 – Apr 2016
Network Intern

- Worked closely with experience engineers to design network communication infrastructure for customers.
- Learnt different network communication protocols used in industrial.
- Innovate new solutions for system redundancy.

CO-CURRICULAR ACTIVITIES

Nanyang Technology University, Welfare Service Club, Singapore Jun 2021 – Present
Centre Head (Friends of Children, Youthniverse)

- Lead a team of 14 volunteers in weekly engagement with the service user.
- Plan and execute various social lifeskills for the service user.

Nanyang Technology University, Welfare Service Club, Singapore Sep 2019 – May 2021
Member (Friends of Children, Teen-Edge Club)

- Coach at-risk youth on both academic and social lifeskills.
- Plan and create a video montage of youth's active participation.

SKILLS

- Languages: Proficient in English and Chinese
- Digital Skills: C, C++, CSS, Java, Javascript, HTML, Python, PHP, SQL, After Effect, Premiere Pro, Microsoft Office
- Physical Skills: Automobile Mechanic

RENGANATHAN RAMASAMY

Mobile: +65 96711484 | **Email:** RE0001MY@e.ntu.edu.sg
LinkedIn: https://www.linkedin.com/in/rramasamyy/ | **GitHub:** https://github.com/rramasamyy

EDUCATION

Nanyang Technological University, Singapore **Aug 2019 – May 2023**
Bachelor of Engineering in Computer Science,
Related Modules (current semester): Advanced Software Engineering, Cyber Threat Intelligence, Computer Security.

WORK EXPERIENCE

Tuition Teacher at Math Vision Enrichment Centre **May 2019 – Aug 2019**
- Taught Chemistry and Mathematics for Students from Grade 9 and 10.
- Involved in planning the work plan for the week and ensured that the students received the best guidance possible.

Singapore Armed Forces - Infantry, Artillery, Transport operator, Boatman. **Apr 2017-Apr 2019**
- Assisted in planning of military events and participated in most of the events with passion.
- Conducted routine briefings before tasking for men to ensure they understand their details.
- Participated in outfield activities which includes travelling to Brunei as part of the training.
- Operated the Boat for National Day Parade performance.

PROJECTS

Highlighter App designed for News Media Companies. **March 2020 – May 2020**
- Built a Mobile Application with Android Studio which allows users to highlight their favorite portions of the news article and to save them.
- Built an innovative layout with unique shapes and designs.
- This project was presented to Organizations such as Straits Times and Google. This eventually was selected as the best prototype compared to other ideas which were presented.

Dengue Alert Mobile Application **Jan 2021 - May 2021**
- Built an Android Mobile Application based on Flutter to alert Users to on their risk of Dengue based on the current live time and location. Added other useful features such as a checklist for them to follow and be safe.
- My contribution involved using Flutter to code and make sure that the pages are accurate in design of the prototype we created and the buttons are functioning as planned.

Real-Time Canteen Display System **Aug 2019 – Nov 2019**
- Graphical User Interface constructed using Python and Tkinter module to display Canteen Stall Information of each stall based on real-time and user-defined Date and Time. The stall data is extracted from a separate Excel File into an interface application.
- Developed the code and integrating the back-end section and designing of the front-end user interface; completed it successfully despite being new to Programming.

SKILLS

Languages : Java, Kotlin, Python, C, C++, JavaScript, Verilog, English, Tamil.
Web : HTML5, CSS, ReactJS, BootStrap
App Development : Android Studio, Flutter
Database : SQLite
Data Analytics : Pandas, Scikit-learn, NumPy
Operating Systems : Windows, Ubuntu Linux, Kali Linux, FreeRTOS
Hardware : Microcontroller Programming, Raspberry Pi, Arduino, Cortex-M4, Basys3
Other Tools : Microsoft Office, Unity Game Engine, AutoCAD, Project Management

SANNABHADTI Shipra Deepak

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EDUCATION

Nanyang Technological University, Singapore **Aug 2018 – Dec 2021**

- **Bachelor of Engineering (Computer Science): 4.40** (**Expected)**
- Expected Honours (Distinction)
- Accelerated Bachelor Programme
- Relevant Modules: Data Structures, Algorithms, Object-Oriented Design and Programming, Data Science and Artificial Intelligence, Software Engineering, Databases, Software Systems Analysis & Design

WORK EXPERIENCE

Visa Inc.

Software Engineering Intern **Jan 2021 – Jul 2021**

- Built a business value analysis dashboard that tracks & reports on manual labour hours saved by the automations provided by Resolve.
- Developed skillset on Frontend Javascript (Angular Framework), Backend Javascript (NodeJS framework), integration with MySQL & Docker technologies, to create a dashboard ready for future resilience and adapted to go live with the product.

ACADEMIC PROJECT

Nanyang Technological University, Singapore

Software Engineering Project **Feb 2020 – Mar 2020**

Title: HDBFinder

- Created an Android mobile application that provided and filtered HDB information (such as location, pollution, proximity to facilities), using information from public government APIs and databases.
- Implemented MVC (model-view-controller) architecture in Flutter to allow for high cohesion, abstraction and easy extension.

Software Systems Analysis and Design Project **Feb 2020 – Mar 2020**

Title: Educational Game

- Implemented an educational application using the Unity Development Platform (accompanied by Firebase for database support), aimed at helping students learn the Software Engineering concept of Use Case Diagrams; included a 3D "Overworld" that served as the hub for mini-games and a leaderboard.
- Utilised the Call and Return Architecture style to keep each subroutine either directly or within one degree of invokability from the master control, and allow easy integration with minimal design changes.

SKILLS

- **Languages:** English, Hindi, Singapore Sign Language (SgSL)
- **Technical Skills:** C/C++, Python (Pandas, NumPy, Matplotlib, Sklearn), Java, HTML, CSS, Flutter, Dart Raspberry Pi, TensorFlow, Arduino, NodeJS, AngularJS, Docker, MySQL
- **Software Application Skills:** Microsoft Office 2019
- **Online Courses:** Introduction to HTML5 (Coursera), Introduction to CSS3 (Coursera), Intro to TensorFlow for Deep Learning (Udacity)