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**RMIT University Vietnam**

**COSC2083 – Introduction to Information Technology**

**Semester 3 - 2019**

Tengitar group

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2. Vo Thanh Luan – s3822042
3. Tran Dang Bao Nhi – s3751881
4. Huynh Ngoc Tuyen – s3818311

ASSIGNMENT REPORT

Assignment 3: Our IT Project

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Team Profile

## Võ Gia Bảo

The first member of our group is Bao, and his nickname is Bee. His student ID number is s3823477. He comes from Kon Tum city which is known as the junction of the Indochina and he came to Ho Chi Minh city for higher education. Bao has many hobbies such as going to the gym, play with his doggie, smoking. He is keen on Website Development and Cyber Security in terms of Information Technology. He admits himself as am a fresher in IT industry and willing to learn more in order to develop his career.

## Võ Thành Luân

The second member of our group is Vo Thanh Luan. He was born and have been living in Saigon for 18 years, he lives with his family in District 7. He is currently studying Information Technology program at RMIT Saigon University after graduated from Trung Vuong high school on July 2019. Luan’s passion for technology is based on the love of learning the trends that technology is making to work more effectively and see progress and success. Information Technology is the big picture, which is a place where many interesting things have not been discovered yet and he is passionate about learning it. He does not have much experience about IT. However, he is a hard-working person who have always desired to study and experience during his studies at RMIT University.

## Trần Đặng Bảo Nhi

The third and only female member in our group is Tran Dang Bao Nhi, and her student number is s3751881. She admitted that she doesn’t have any relevant background in IT field, so everything is new to her especially coding mindset of thinking, the algorithm with less words and more calculations. Everything seems to give her many lessons about scientific codes and doing technical reports. Her hobbies are listening to music, wandering around to release stress, learning new things and reading about psychology report, researches. She was once major in literature so I don’t have any related experience in Information Technology field. She is eager for learning and gaining both experience and knowledge during the time I study at RMIT.Nhi said that her particular interest of the big picture of AI is natural language processing, which is one of branches of Deep Learning.

## Huỳnh Ngọc Tuyên

The last member of our group is Huynh Ngoc Tuyen, his student number is s3818311 and member of the group Tengitar. He is currently enrolling RMIT’s Bachelor of Information Technology as a first-year student. Tuyen was born in Nha Trang but lived most of his life in Ho Chi Minh City. He really loves programming, solving complex problems and studying, researching things related to Computer Science, which is the main reason why Tuyen enrolled in the IT course. He always strives for more in-depth knowledge about how computers read machine languages, how computer components work with each other and, more recently, how Artificial Intelligence and Machine Learning works. He participated in SaigonTech’s SRobot competition and peaked at 5th place. He also got 2nd place in SIU’s IT Olympics. He hopes after his studies at RMIT, he can advance further, improving both his hard skills and soft skills.

## Group processes

Our group communication through Assignment was effective and collaborative. Although we had some conflicts, we got through them by understanding and constructive feedback or conversation. All of the member in the group well behave and express respectful attitude toward each other. Our working time were always filled with hilarious atmosphere and appreciated behaviours to others.

The change that we made on this assignment was the team division, we were not working together as four people like the previous one but divided into two different teams. Tuyen and Bao were on the technical team whose jobs were cutting, soldering LEDs and writing coding program for Arduino. Nhi and Luan were on the research, report writing and material preparing team, whose jobs were to give a theorical base that was related to psychological impact of colour on human cognitive behaviour and writing report for assignment 3. Our team know each member strengths and weaknesses, so we provided each of them appropriated tasks that can make them feel enjoyable and interesting about. The result was beyond expectation and our team worked well with each other; we always gave a helping hand to each other whenever someone in need. The collaboration of the general team was great, and each particular team was also awesome. Both teams completed deadlines on time and also had time to explain for the other team the work so that all of the member can keep track on the group work.

## Career Plans

# Ideal Jobs

* Võ Gia Bảo – Web Developer

Enroll in the Web Development stream of RMIT University. Via Linked-in Learning, learn relevant skills and state-of-the-art technology that makes sense for further careers such as database concept, JavaScript, JavaScript Frameworks, external libraries, and cybersecurity.

Finding the opportunity for internship while studying in University via career Fair, involved websites or Becoming a freelancer to get more experience.

In terms of front-end, Enhance the knowledge about the market trend of the website interface. Research to find the secrets and purpose of the design of the giants such as Facebook, Quora, etc. be familiar with the changing of a front-end framework. Know how to make modern data structure in the back end, how to limit user permission and prevent cyber threats such as crawling data.

Becoming a full-stack developer strongly require experience, creativity, and determination. Becoming special and unique is a part of each web developer.

As I have mentioned before, the most important thing of a web developer is the experience. For example, when you create a modal that contains data from the backend. You have to cover all the situation that keeps the website looks acceptable. Sometime, the modal will be nice if it is full of data. On the other hand, it will be weird if there is a lack of data from the backend. With the experience and creativity, a web developer can be a senior in this filed for 3 years. If having enough experience and reputation, a junior web developer can become project management after 8 years.

* Võ Thành Luân – Software Developer

Enrol in the software development stream of RMIT University. Actively learn related programming language like Java, C++, Oracle and so on. Some useful knowledge about SQL and database can greatly enhance the performance of the good software developer.

The way of becoming the software developer very challenging and exciting at the same time. To be able to work as the software developer in the future, it would be compulsory to look for the intership while studying at the university to gain more in-depth knowledge and be more confident in the real working environment.

After knowing the basic concept of the progamming language, I will be able to work as the application developers which in charge of creating any kind of softwares to be used to be the connecting bridge between human and computer.

The next step is that to become the software engineer. This position involves in a lot of responsibilities and specialized skills such as extensive framwork, RESTful API and so on which get me more in-depth to the computer science field.

Regarding the further position for the software developer career is that I can study the Ph.D degree to be able to work in science software development field which strongly requires problem-solving skill, quantum computing and in-depth research to find the algorithms to solve the real-life problems.

* Trần Đặng Bảo Nhi – Business Analyst

Enrolling in Bachelor of Information of Technology in RMIT and Machine learning stream in the course. Along with learning additional course related to Business such as Management or Marketing classes.

Researching and reading more about the economics related topics which can be range from new technology applications to global economic trends. To have up-to-date information and knowledge to fully satisfy the job.

Looking and applying to research short term program international and could be a research assistant.

Preparing for the internship at technology companies as same position, also looking for a chance to work as marketing intern. Through these experiences, I can have more insight about the industrial work force and daily tasks of the dream position. And one of the most interesting I think I can have will be a chance to make” job shadowing”, or other words, to have experience by learning from the people currently take that job.

After my internship at the 7th semester, I will find an intern or full-time jobs at the other countries to gain working experience in international environment, and have more culture diversity collaboration, which will be win win situation both practical and mental enriches.

Enrolling in quantitative finance master to pursue a career of project manager in technology company.

* Huỳnh Ngọc Tuyên – Data Scientist

Enroll in Data Analytics and Data Science courses. Learn relevant programming languages and technologies that involves and relates to the field of Data Analytics.

Look and apply for Data Analyst and Data Engineer internships which will provide firsthand experiences and act as a steppingstone for a Data Scientist jobs

After internships, I expect to start out with a Data Analyst position, doing statistical and data graphical representation works.

The next step is becoming a Data Engineer, getting more involved with coding and more field work, involving the actual raw data itself. During this time, I would try to make some time and get a master’s degree in Data Science.

The biggest milestone would be becoming an actual Data Scientist.

From there, many options and opportunities open up for a long-term position. I could either work my way up to a CTO (Chief Technical Officer) of my organization or get a Doctorate degree by doing research and find/invent something new.

# Common elements

# Learning new things and gain experience or internship is our first common, since this type of need is necessary for a student to get ready and enough knowledge for the real-world working environment.

# The second common, is all of us need bachelor’s degree in information of Technology.

# We also need to expertise one specific or some coding programming languages in order to be qualified for our job.

# Excellent in English

# Differences

* The first difference among the four jobs is that some are mostly technical, and some are not. For instance, Nhi’s ideal job is about Business Analysis which a combination of business and technology, but on the other sides, Bảo and Luân jobs are to be developer which is 100% technical based jobs. Tuyên’s ideal job is becoming a Data Scientist, which is not 100% Information of Technology, but a latest and most trendy of Technology application with the essential need of being good at Analysis and Algorithms.
* The second difference ranks among the group ideal job is mostly about hard skills and soft skills required for these jobs, along with additional certificates, experience or specific requirements that are important to the jobs.
* Firstly, we work as different position and areas such as developer, scientist or manager.
* Secondly, the experience and how to gain it and make it becomes a useful tool for our future career are also various and unidentical in through our different perception.
* The third difference among the four jobs is that some are mostly technical, and some are not. For instance, Nhi’s ideal job is about Business Analysis which a combination of business and technology, but on the other sides, Bảo and Luân jobs are to be developer which is 100% technical based jobs. Tuyên’s ideal job is becoming a Data Scientist, which is not 100% Information of Technology, but a latest and most trendy of Technology application with the essential need of being good at Analysis and Algorithms.
* The fourth difference ranks among the group ideal job is mostly about hard skills and soft skills required for these jobs, along with additional certificates, experience or specific requirements that are important to the jobs.
* The last difference among our career plan is that some of us want to make it to PhD or master to have deep understanding about theorical based of concept we learnt, and some of us want to be an expert in the industrial, means to have practical experience.

# How similar or different are your career plans across the group?

* Web Developer
  + Hard skills:
    - HTML stands for HyperText Markup Language.
    - JS Front-end Frameworks such as Vue, React, or Angular should be considered.
  + Soft skills:
    - Choosing documentation and reading
    - Good behaviour and right attitude self-awareness, willing to learn.

Experience:

* + - One to three years for Junior positions and from three to five years for Senior positions.
* Software Developer:
  + The skill:
    - Strong skills that related to data structures, algorithm, storage systems and problem solving
    - Hand on and good at software development skills.
    - Experience with third-party libraries and APIs.
  + The Experience:
    - 2+ years of experience with high-traffic distributed systems and client-server architectures
    - Minimum 3 years of experience working in C#
    - Experience building complex and impactful software in a team environment
  + The Qualification:
  + Has strong knowledge of the following technologies and languages:
    - HTML, CSS, JavaScript (JS)
    - JS frameworks (Angular, Node, React)
  + Ability to adapt quickly to an existing, complex environment.
    - Some useful certificates:
    - Amazon Web Services (AWS)
    - PMI Agile Certified Practitioner (PMI-ACP)
    - Microsoft Azure
* Business Analyst:
  + Knowledge of BPM tools (Runmyprocess, Bonita, Apian, etc.), BPMN 2.0.
  + Strong knowledge and experience on database modeling (relational and multi-dimensional) and ETL flows.
  + Possess a professional skills and expertise in fact-finding techniques to discover or achieve a better understanding of the requirements of the system (requirement discovery process)
  + Advanced skill in using suitable tools for business modeling, drawing business flows/diagrams

Soft – behavioral skills:

* + Candidate must be social, friendly and easily adapt with al colleagues.
  + Candidate with good soft-interpersonal skills is a plus.
  + Being well-organized and have a good time management skill.
  + Can work independently as an individual and cooperatively with the team as well.
  + Have experience about organize event, which including run workshops and design customer’s processes using the BPMN 2.0.
  + Good problem-solving skill is a plus, people who can solve complex problems with ability to resist stressful situation and time pressure.
  + Recommend solution approaches based on sound judgment in evaluating different/ alternative approaches.

Data Scientist:

* + The skills
  + Be a quick learner, the world of technology is ever-changing, and I need to adapt to every change seamlessly
  + Self-sufficient but also a great team player with good communication and social skills
  + Have a good mathematics, statistics and modeling foundation
  + Able to query data and create from simple to complex algorithms for data analysing
  + The experience
  + 3+ years of practical working experience in the data science, analytics field
  + Be proficient with SQL and statistical programming languages like Python, R, Scala and big data frameworks such as Hadoop or Spark
  + Have a strong understanding and experienced in Artificial Intelligence, Machine Learning, Deep Learning frameworks like TensorFlow, PyTorch, CAFFE, etc.
  + The qualifications
  + Bachelor or Master’s in Statistics, Operations Research or corresponding fields; a Doctorate is a big plus
  + Some preferred certificates that focused on useful skills:
  + Certified Analytics Professional (CAP)
  + EMC Proven Professional Data Scientist (EMCDS)
  + SAS Certified Predictive Modeler using SAS Enterprise Miner 14

#### Project Description

## Topic

A combination of hardware and software to create an extraordinary and unique IoT project. The expected outcome of this project is a functional demo that is representative of what we are proposing to the school. We named it “4: SST” which has two meanings. Firstly, it describes itself when other first heard about the project, something related to the 4th floor of RMIT, the School of Science and Technology. Secondly, it is spoken aloud, it is pronounced “for SST”, this project is made for SST by SST students, it is our contribution to this amazing part of RMIT and made us feel more belong to RMIT.

Our project uses an Arduino, 242 LEDs in total, a motion PIR sensor, an AC to DC power supply and various other miscellaneous components. Together, they make a wonderful LED display that runs a variety of animations, only when there are people around. We achieved this through applying our knowledge from our courses as well as knowledge from many other fields, such as design, electrical engineering, programming, etc. The big plan is to propose this to the heads of SST as well as RMIT and get approved. The development path will focus on more animations, code optimizations, incorporating a light sensor, replacing the sensor with a thermal camera for even better human recognition, an app that other students can use to make animation of their own and integration of AI.

## Motivation

Our motivation rooted from the idea of making simple things becomes fancy. First, we only want to add some features to make white plain number 4 becomes more interesting. However, we thought if the only purpose is to beautify the number 4 we can just use a projector like the 5th floor. As a result, we decide to make something both beautiful and supportive mentally by sending meaningful message in the display interface based on specify factors and emotional states without the use of projector. We also see an increasing trend of Internet of Things in the use of technology application, so we are planning to make a software to control a light up and image changes in the accomplishment of weather and number of stress level based on the general academic calendar.

## Landscape

Same with our inspiration for the project, similar decorating systems can be found on the first floor (near reception area) and fifth floor of RMIT’s Building 2. These designs used a projector and runs various animations and videos on to the numbers that are “interactive” to the numbers themselves. Since it’s a projector, those animations are shown with very high fidelity as well as running at a smooth framerate. The projectors seem like a better choice against our project but there are things that make our LEDs display special and stands out.

Firstly, even though we have a lower pixel resolution and low framerate, all of our animations are handmade by us and with an app as our future development milestone, those animations will be handmade by you, other students. Secondly, projectors are run continuously, as long as it is plugged in, the animation runs. Though the projector’s energy consumption impact isn’t significant, it is still waste energy when it is running but no one is looking at it. Our project is equipped with a motion sensor which will activate the LEDs, through the Arduino, only when there are people around. This promotes a green environment as well as increase general environmental awareness. Thirdly, the projector’s color on the number’s surface is not ideal and some animations shown are blurry and hard to see. This is due to the effects of brightness of its surrounding environment and the focus of the projector’s lens. Our LED display ensure viewability from all angles and does not give in to the effects of its environment’s luminosity.

## Aims

# Decorate and design the number “4” to become more attractive and supportive.

It is all about the white plain number 4 on the 4th floor of RMIT’s building 2, where the School of Science and Technology is situated. Our idea rooted from the thought of redecorating the white and blank number “4” to become more attractive and eye-catching to student, lectures or even visitors. Our belief is to make a first impression onto those who comes to the 4th floor. The uniqueness of our project is that we will design an energy-saving program through the use of a motion and infrared sensor to detect whenever there are people around or not. We also aim to support students through our animations and colors, which can have a beneficial temporary psychological impact, improving their academic performance and encourage them not to be absent from classes.

## Goals

# Academic performance support

According to our selective design and research, we really want the new appearance of number 4 not only be beautiful but also be helpful in such situation. We will discuss more about our psychology-based theory and applications.

# Achieve the project with smaller scale

We decided to make the scale of number 4 smaller than the real measurement of model displayed since we would run into financial issues if we worked on the real scale model. We used Scrum as our main project management strategy – a methodology to efficient project end to end solution in order to have the good organizations and process management of project.

# Effective sensor detection – Reduce energy waste

Our project is about internet of things and we work mainly with LEDs, sensor movement detection and Arduino. So, our technical team aim to have the sensor work perfectly in order to reduce the waste of power supplies and Arduino active energy. As a result, secure the workload and correction of sensor can optimize the usage of LEDs and other supportive components mentioned.

# Optimize the coding program

Every product in software area need this technique, the purpose of doing optimizing is to reduce the memory storage of Arduino by cutting off unnecessary functions and variables which unnecessarily consumes Arduino’s constrained memory space.

# Safety guarantee

We targeted to achieve both effective and beautiful number 4 model since in the academic environment safety is the most priority. We have to carefully measure the appropriate voltage and current requirement in order to buy the correct power supply that does not pose a fire risk and has a safety fallback measure.

## Plans and Progress

# Expected Outcomes

The LEDs will light up whenever there are people around and in the detection zone of 4 meters:

We expected our demo to run without any posing errors and be energy efficient to limit the total power draw. The PIR sensor is used to signal the LEDs turning on the lights and show animation when there are people, and then switch it off when people left. The sensor can detect both heat, in the form of infrared, and motion. Any object that emits infrared and moving in the distance of roughly 4 meters, and within a 170° cone, will trigger the sensor. The received signal will be transferred to the Arduino which will run the animations codes.

# Pattern display and function work correctly

Our program’s designs are patterns and animations with the support of pixel drawing tools and Python. We recruited the help of Python to do array generation for the main sketch, generating arrays LED positions. So, in order to display and control the showing pattern, we must make sure to draw the correct pixels and the array generation turns out correct.

# Supportive and meaningful message

The project also aims at helping other students psychologically, through the application of color methodologies in psychological affection. We elaborately display the colors our images to suit these needs. As a result, we really looking forward to seeing the effect based on survey responds which will be collected after the project is properly launched.

## Plans:

# The story of “4: SST”.

At the beginning of the stage, we begin to make a tracking of room timetable for student that need a free working space at school but the scope for that project was quite out of our ability. Then we move on to dive ourselves in the creative process, then other idea like combine design and programming to make our project more innovative and outstanding. However, we found that these ideas are somehow inappropriate to our expectation. Then finally the idea of light up the number 4 was born at the time we explore the Design department.

The combined application from both hardware and software leads us to develop an Internet of Thing oriented project. In addition, we also want to construct something that will further benefit the community. As the result, we found this idea after wandering around the school and looking for material that were in need of improvements. With group consultations with Dr. Duy, Dr. Yossi, Mr. Long and Ms. Anna and the application of MVP, we were working with the draft first then moved on to make the idea be practical and optimal as far as possible.

# Choosing material and getting started.

After the ideation, we started to work on testing the function of each components and learn more about Arduino. Our team divided into two different teams; each has responsibilities. One team went on with the LEDs and power supply, create a designate program to run the codes, the other team worked on research and pattern design, and mainly work on report. But the process to Arduino choice was not so simple, it was a story itself to tell. When we decided which module to choose between Arduino and Raspberry, since we had been working with Raspberry Pi for about a week then realized that the microcontroller was quite hard to use. The reason why we first choose to use Raspberry Pi is all of us can code pretty well in Python and coding tasks are easy to divide but the problem why we canceled that option is that none of us know how to work with Raspberry Pi. So, as the result, we used Arduino as our main supporter.

## Progress:

# Technical details – LEDs remapping, storage considerations and sensor effectiveness.

During the development phase of our project, one of the biggest obstacles that we encountered was the LEDs mapping. We control our LEDs through exclusively Adafruit’s libraries, but this raised a problem, those libraries don’t understand the irregular shape of the number 4. All built-in functions as well as methods in the libraries are configured to work with squares or rectangles, not peculiar shapes such as the number 4. The approach we took to tackle this problem was LED remapping, basically telling the libraries that it is working with a rectangle, but some parts are missing, can be visualized like this: [insert white, black Unicode picture]

To remap our LED matrix, we must, by hand, list out each individual LED’s position in an array and with LEDs that aren’t available, we simply named it -1. This sounds tedious but with the power of python, we quickly sketched up a script that can do just what we need with less effort. With 4 to 5 lines of code, LED remapping gives us the freedom of using built-in functions and methods as well as the ease of making pictures, patterns and animations. The final LED indexes array look like this: [insert LED index array picture]

Another obstacle we encountered, though not as major as the last one, was storage space. There are 3 “pools” of memory in an Arduino, the Flash memory, SRAM (Static Random-Access Memory) and EEPROM (Electrically Erasable Programmable Read-Only Memory). When creating variables, such as LED indexes array or sprite arrays, they are stored inside the Flash memory before being copied into the SRAM for use. On our Arduino Mega 2560, the Flash memory has 32 times more storage space than the SRAM. Therefore, with our abundance of sprite arrays and bitmaps, we should store them inside the Flash memory instead of the SRAM, by using the keyword “PROGMEM” when declaring byte arrays.

Sensor effectiveness is the least concerned factor during the development phase of our project. The sensor is equipped with 2 potentiometers which let us adjust the detection range and the time delay, how long the signal remains HIGH after motion is detected. Finetuning these coupled with changing the sensor’s mode to Repeatable Trigger Mode which restarts the time delay whenever motion is detected. So, as long as there is motion, the animations will keep on running. When no motion is detected after the animations, the sensor will go into its 3 seconds block, stop receiving any kind of signal. Being a crucial part of our project, this little sensor is surprisingly easy to use, effective and caused the least problem in our project.

[1] <https://www-annualreviews-org.ezproxy.lib.rmit.edu.au/doi/pdf/10.1146/annurev-psych-010213-115035>

**Features of the project and how it is done:**

“4:SST”, our project, applies various concepts from Internet of things, combining six different ICT components which are Hardware, Data, Software, Information, procedures and people. Using what we learned from Introduction to Computer System course, this project uses an Arduino, 240 LEDs and a motion PIR sensor. The project will light up the number “4” on the 4th floor of RMIT, where the School of Science and Technology is situated, whenever heat and motion are detected.

Main features of our project:

***Arduino controller:***

The Arduino is an open-source electronics platform, it is equipped with easy to use hardware and software. This board can read the inputs from sensors, i.e. Passive Infrared sensor, and write data to its output pins, i.e. the LED strips. We decide to use the Arduino Mega 2560 instead of a Raspberry Pi because of the convenience and easy coding syntaxes and semantics. The Arduino uses C, a low-level programming language, with some tweaks and changes to make it more robust such as built in functions, delay(), pinMode(), and predefined main functions setup() and loop(). Backed by a large active community and vast number of libraries, it is easy to find documentation, fix bugs and look up solutions online, this can be of big aid during our project. An Arduino is also very safe to use as well as very durable.

***RSP power supply:***

We chose a 5V 40A RSP power supply as the “power house” for our project. It can efficiently and comfortably provide power to all of our LED demands. Since 40A is very dangerous, we practiced safe handling of the power supply as well as insulated the wires correctly.

What does it do:

The RSP power supply will act as the main power source for both the Arduino and the LEDs, under the circumstance that the Arduino is not powered by any other sources. If the Arduino is already powered by the computer, through the USB cable when we are programming, the RSP power supply will then act as an external source to make sure all LEDs light up, because an Arduino alone powered through USB might not be able to drive all the LEDs.

Finished target:

* We finished testing the Arduino with simple functions for those like LEDs workable with suitable coding program. We are sure about each of the component and the ability to work individually.
* After that, we tried to combine the use of sensor and LEDs, even with the real distance in real worlds and assuming distance testing.
* Craft a coding program structure and list all the needed functions, software applications.

In progress:

* We still work with the power supply which can be considered as hardware part and electronic components. We still in the process of testing the safety of power supply RSP about the source voltages and division of LEDs line electronic power needed.
* LEDs cutting that fitted to the model made of plastic. We are stretching the model in software to arrange the position of LEDs and calculate correctly how many LEDs in each line.

Future development:

* Optimize the code along with the more energy saving method to large scale.
* Calculate the new necessary components that will be more suitable to the upgrade LEDs if putting in the bigger model.
* Provide a model that is previewed by experts in electronics safety to ensure the product adheres to the RMIT’s regulations regarding electronic devices.

## Mental support – Theorical based for our project:

# The psychology studies on color perceiving effects on functioning human:

Color is defined and modeled based on their robust focus on different way, for example on the way human brain and eye process color stimuli (e.g. color physiology and neuroscience) or on practical issues such as color reproduction or color deficiency and color appearance phenomena(e.g. illusion, synesthesia). Therefore, color has the significant impact on human both physically and mentally. Color can be seen as the representation of its category.

# RED – GREEN – BLUE: fundamental colorations and impact on display

* Red affection on physical and academic performance:

Red coloration has the signal function in competitive interaction which was rooted from the testosterone-based indictor of dominance, contribute to the characteristics of aggressive and encounter. As a result, in competitive environment such as sport tournament or energetic event competitions, red color enhances performance attainment.

However, in the **academic side**, red coloration can be considered as aversive implication (avoidance motivation) in achievement context, seeing red before an exam consequently result in not well performance as this color signal can be seen as threat, fear and evokes the avoidance feeling.

* Application

Red give people greater physical strength performance and be more assertive. Red may have a stronger effect on combat sport where direct method and physical aim is force. As a result, our decision is to show red at the beginning of the day where people need physical support as many tend to feel discouraged or sleepy and they need something to burn the fire up for a productive day. The other perception is that at the beginning of the day people often feel the sense of refreshment and positivity, therefore seeing red or long-wavelength color will give them more energy and resulting in such an efficient work. Color have the mood-altering effect on human nerves, for instances the object with different warmth color will give motivation and energy for those feel exhausted, exploited after a long time looking into the computer scene

Furthermore, red id the color that represents our university signs, which contribute to the enthusiastic, energetic and youth. So, our expectation in school establishment day, carnival or any kinds of experience day when school need the celebration, the number 4 decoration will show the light red with gorgeous patterns that we can proudly introduce to our visitors.

# Green and blue: Creative and calm – physical and mental impact

Back to the studies of color on academic performance, showing that blue in overall has positive effect on testing room, they have positive effect on performance on creative and accurate focusing speed since blue or green may be particularly beneficial for creative performance. A study found that who viewed green or achromatic color control perform better in anagram, analog and math tasks. (Elliot et al. 2011, Gnambs et al. 2010, Ioan et al. 2007, Jung et al. 2011b, Lichtenfeld et al. 2009). In addition, blue and green seem to be considered as positive and relaxing content which is based on the link in the natural realm (e.g. blue sky or water, green foliage or trees). For instance, blue, e.g., openness, peace (Kaya & Epps 2004, Mehta & Zhu 2009).

* Application:

In the week of test and deadlines, we will purposely show many calm colors with slow-moving and peaceful pattern to make people calm down a little bit and feel relax, since the week will be somehow exhausted and stressful for them.

Applying these knowledges into our design, we will set the time display accomplish with the real time of the day for example in the time after the lunch, to have different types of color that will give significant effects on particular task with the link to human cognitive. A few studies shown that white with the accomplishment of other few highlight colors are also a good option to enhance academic performance and helps people with learning disabilities like deficit –hyperactivity disorder to be more attentive and perform better.

# Further development on impact and display study:

We are still on the researching process of applying a spectrophotometer which is a device that assesses color at the spectral level [2] to create the color stimuli. We must consider different types of environment and how they will affect our display (e.g. direct sunlight or cool white fluorescent lighting) and observe viewing angles. The combination of color assessment in terms of formats which it will be displayed on, the presented on a computer or LEDs –based screen and the physical objective. That can be overall give the accuracy and flexibility for the ideally methods to show our number 4 in this approach and optimize the affection of our project. Moreover, the most important things are that we need to work more on the effect of hue while controlling for lightness and brightness which also includes other factor like chroma (saturation) and typical perceptual experience (presenting color by overhead lights).

[Nakashian, 1964](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4383146/#B80)

What have been done:

* Our team have completed researching about color pattern and the affection in human being moody. We tried to put and categorized colors in matched types of others and blocks.
* Design the image with selective and common mood categories like motivated, inspiring or calm anger.

In progress:

* Reconsider design to match the numbers of LEDs display with bigger scale.
* Measure impact and survey on the student feeling of this new feature then went to the final product.

What need to be done:

* Develop the program to support well-being of student and increase academic performance through virtually support.
* Large scale survey and collect student’s responds and teacher advices.

## Our future difficult:

Those reports are just theorical based, we still lack mass survey which can practically gain student experience on how the decoration affect their emotion and how emotional state vary according to each personal life experiments and viewpoints. We still need a lot of efforts to the improvement of the project.

## Project further development and plan:

Due to the limited time and knowledge, we could not implement Artificial Intelligence technology in our project. However, the use of AI will help us in design a more effective detection, this will be the emotional detection according to the mapping of point and human face recognition along with the natural language processing to receive the voice of human. In future, we really want to make the decoration something that can be customizable like showing color or image with the comment of single person.

What do we need to know more is the efficient system which combines all the necessary technologies like AI, machine learning methods, algorithm and the sustainable power supply with the green energy and automatically modify the controller’s heat. Since more complex features mean that the demand for a more powerful controller that can handle all the functions and support other components. Furthermore, the information of academic calendar and time matching with reality required the need of API and programmed codes.

## Team roles:

Technical team:

Võ Gia Bảo:

Technician and hardware control manager. Website and git hub manager

Primary roles:

* Working with hardware and components such as soldering, cutting LEDs.
* Leading the process of measurement and model making
* Writing code that work well with Arduino along with showing beautiful animation
* Writing technical part for project
* Manage Github and help Luan to do the website

Huỳnh Ngọc Tuyên:

Technician Lead and coding manager. Report proofreader and formatter.

Primary roles:

* Working with Bao to do the cutting and soldering task.
* Coding all the program function and bone.
* Making animation with Bao but mainly about color display.
* Proofread all the report and reformat the group report.
* Making power point for the presentation.

Writing team:

Trần Đặng Bảo Nhi

Research leader – team manager and task provider.

Primary roles:

* Making sure that all the member engages in the group working process and on time in each deadline.
* Leading the research to make the theorical base for the project about color, in order to make the project both beautiful and supportive.
* Writing the report of the group.
* Helping in preparation process for the technical team.
* Solve the group conflict and setting meeting time.

Võ Thành Luân:

Researcher – Website manager.

Primary roles:

* Research to make the theorical base for the project about color, in order to make the project both beautiful and supportive.
* Support technical team in soldering or measuring process.
* Making the website and modify the content along with managing the google survey answer.
* Writing particular part for the report.
* Drawing logic diagram for the code process to give clear picture of the group project.

## Scope and Limits

# Product Scope:

1. Right calculation and LEDs arrangement:

This is our first priority since this step contributes an essential part to light up the LEDs in the right order and furthermore demonstrates image like what we expected each of the LEDs. We calculate the size of each LEDs correctly and arrange a particular number of LEDs for each line.

1. Safe and energy-saving mobile power supply:

The main component that support Arduino is power supply that give electronic flow to power the Arduino without the use of laptop or energy resource. We have to guarantee the safety for the floor with many people on it. We do not want any accidence related to explosion and electronic

1. User friendliness and experience:

Since our project outcomes will use to support student or other word user, so we have to make sure that we create an interface that is seem friendly to the user in order to optimize the user experience and satisfaction.

# Project Scope:

* Aesthetic and supportive, reachable to students and staffs: One of our goals is to attract student and visitor coming to the 4th floor. Therefore, our number 4 display form have to be well-designed and impressive with the base on the research result psychological impact. Since the appearance of number 4 is our main features we really concentrate on the design and colour display with appropriate surface.
* A shining number four with extraordinary ability and display function which is distinguish from normal LEDs board. Inexpensive and self-powered.
* Motion notification to detect people appearance and temperature, receive, operate and transfer data to decorate number 4 with energy-saving usage.

## Tool and Technologies

# Teamwork

* GitHub: This platform is a version control which allows us to make the repository to upload our works and collaborate with each other.
* Microsoft SharePoint: This acts as a content management system that is used for documents storage and assist in bringing a team together.
* Microsoft Excel 2019: This spreadsheet application that we use to create the chart and graphic display for our project.

# Sketch Drawing:

* GIMP**:** This is an image editor software allows us to create sprites and bitmaps for our LED display.
* Lucid Chart: This platform gives us the ability to illustrate the development process and workflow of our project with a flow chart.
* Smart Draw: This is the website we use to redraw the demo number “4” which is 5 times smaller than the actual size.

# Essential Software:

* Arduino IDE version 1.8.10: This is an integrated development environment application specialized only for Arduino which allows us to work directly with Arduino.
* Img2Code: This software will convert image file (.JPEG, .PNG...) which contains arts and drawings we created with GIMP to C++ byte arrays. This software is just a representative of the various “image to byte arrays” converters available.
* PyCharm IDE version 2019.3.1: This IDE allows us to write Python language to storing array and remapping the LEDs.

# Arduino Libraries:

* Adafruit GFX: It is required for the NeoMatrix library. It is the core graphic open-source library for all display giving the typical set of design primitives.
* Adafruit NeoPixel: We use existing library to control NeoPixel from the beginning which also have included code for the chip of Arduino.
* Adafruit NeoMatrix: Allows us to control single and tiled NeoPixel displays such as grid assembled from Adafruit 60 LED per meter digital LED strip.

**Programming Language**:

* *C*: This the main programming language we use in Arduino IDE to create the animation and working with the Arduino.
* Python: In order to know precisely the position of each LEDs in the number 4, we use the Python language to do the remapping process.

**Hardware Needed:**

* Arduino Mega 2560/Arduino Uno R3: Primary component which plays a vital role in our project. The Mega is used for the final product and the Uno is used for quick debugging/testing because of its small size.
* Motion PIR Sensor HC-SR501: This sensor detects if there are both heat and motion within its peripheral view, which in turn activates the LEDs accordingly. It has a long detection range and wide view area cone with an affordable price.
* 330 Ohm Resistor: This will be connected from the LEDs’ data pin with the Arduino’s 6 pin. It helps us prevent voltage spikes that might otherwise damage the LEDs.
* LED Strips: We use total 4x 60 Led/1m NeoPixel RGB LED WS2812B strips.
* Breadboard: This is used to connect the components together and feed out power to the sensor and LEDs.
* RSP Power Supply (5V/40A): This will provide power to the whole system with more than enough amperes to drive 242 LEDs
* Jumbo wires: Connect components together.

**Necessary Tool:**

* Measure tape
* Soldering iron
* Scissors
* Screwdriver
* Paper knife

**Member & Prior Experience:**

* Bao: GitHub, Arduino, SharePoint, Hardware
* Luan: GitHub, SharePoint, Lucid chart
* Nhi: GitHub, Excel, SharePoint
* Tuyen: Arduino, C, GitHub, Hardware, Python

## Testing

Under any circumstances, there are always in need of testing due to many potential risks and errors. Regarding the way we test our system; we do three different kinds of testing: component-based usability testing, functional testing and stress testing.

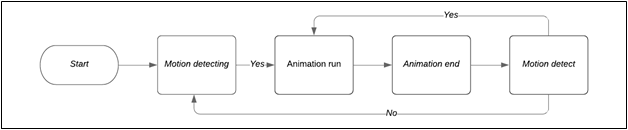


Figure 1: The process of LED Sensor

# Component-based usability testing

This concerned with the improvement of systems from reusable parts (components), and the advancement and preservation of these parts.

Through the test, first time we used 2 LED strips with total of 120 LEDs. Then we remap and write the code in Python to see if it enough or not. During this test, we tried different total of LEDs continuously to observe the result and finally we get our desire quantity of LEDs which is 242 LEDs in total.

Our aim of this empirically testing is testing the ease of use and the usability of interaction components.

# Functional testing

It is a sort of programming testing which confirms that each capacity of the component application, works in conformance with the useful prerequisites. Every single usefulness of the system is tried by giving proper info, checking the yield, and contrasting the real outcomes and the expected outcomes

During this test, we test the main functions of the project which is showing the animation when people nearby. We tried many times to change the codes and scripts until we found the appropriate outputs.

Our expectation is that when we give them input and examining the output, it will meet our requirements.

# Stress testing

This is a type of non-functional testing. It tests parts by pushing it over its ordinary operation conditions to its breaking point. The outcome is then observed to utilized and decide the stability of our system.

For this test, we power the Arduino and LEDs to let it run non-stop for nearly 12 hours to test the stability.

The expectations and goals in this test are that we can guarantee that the system will not be broken down in the under any other situation.

# Timeframe

Our group had begun our project quite sooner, we met at the beginning of week 1 and set our target of ideation progress on the first week. Therefore, in the timeframe we included the process from the start to the end including week 1st to week 13th.

Table legends:

* Blue: All team member
* Green: Technical team
* Yellow: Git manager and website developers
* Pink: Report – writing team

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Tasks** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** |
| Familiarize ourselves with the tech & tools |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ideation – Project brainstorming |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Setting personal and group website, git |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Complete career prospects information |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Writing project idea and description for assignment 2 and draft for assignment 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Buying and testing all components |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Cutting cardboard model and measure carefully the size- Drawing picture on GIMP |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Programming testing codes for the sensor and LEDs individually |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Combine functions of sensor and LEDs together |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Mapping LEDs |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Finnish writing report (skills and jobs, feedback, team profile) with detailed description (aims, tools and communication, roles) |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Finalize report 3 with last discussion |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Demo – and report last editing |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Preparation + Group presentation |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Report formatting and codes submission |  |  |  |  |  |  |  |  |  |  |  |  |  |

## Risks

We estimate the possibility of each risk which can affect the project on a scale from 1 to 10. With 1 it will not affect to the project and 10 indicate it will affect the project the most.

# Arduino protection

Detail: Overvoltage should be taken into consideration. If we connect components that requires voltages and amperes more than the Arduino can supply, it will potentially damage the microprocessor and possibly fry the whole board.

Likelihood:6

Solution: When working with the LEDs from now on, we will use a separate, dedicated power supply for the LEDs, not taking power directly from the Arduino.

# Irregular LEDs matrix display

Detail: The irregular shape of the LEDs matrix of our project is the reason why we need re-map the input data. The remap function, which is difficult to understand, will be handled manually by using creating a “switch” statement. The unusual matrix layout requires us to solder to connect and re-arrange the order of each LED.

Likelihood:9

Solution: As mentioned, to fix this problem, we will use a remap function to manually adjust the LED addresses one-by-one. After that, all the libraries used, the Adafruit libraries, should recognize the “number 4” as a large square matrix missing some LEDs.

# Memory issues

Detail: Bitmap byte arrays, when created, will be stored inside the SRAM (static random-access memory). With 1 bit for each LED and 32 bits for its color, coupled with the low storage space of SRAM, we can expect running into various memory issues. Which may end up overload the whole system.

Likelihood:8

Solution: To tackle this problem, we will use the Arduino Mega2560 as it provides much more storage than the Uno. Furthermore, we will use PROGMEM to store the byte arrays onto the Flash memory, which has much more space available compared to the SRAM.

# Explosion issue

Detail: This contains two potential problems. One is that the resistor does not work properly which can end up overvoltage the circuit. And another is that the inappropriate type of power input may damage to the whole component.

Likelihood: 4

Solution: Regarding how to deal with the explosion issues, we decided to use the separate power supply instead of plugging directly into the computer which is not recommended.

# LED soldering

Detail: The soldering process needs to be done correctly since it can affect significantly to the effectiveness of whole project.

Likelihood: 8

Solution: We need to draw the specific sketch to guide how we solder the LED strips precisely due to after soldering, it cannot be undone.

# Group processes and communications

Weekly meeting:

* Monday: 14:00-15:30
* Tuesday: 14:00-14:30
* Wednesday: 15:30 – 17:00
* Thursday: 15:30 – 17:00
* Friday: 15:00 – 15:30
* Weekend: Online if any emergency that need group meeting

We want to ensure the group efficiency, member engagement and task’s completement of each member, we plan to set usual meeting in face-to-face communication types, our meeting set place on classroom after the lecture or tutorial time or in room 2.4.03 as time zone above.

Following the Scrum daily meeting, we meet daily to keep track on the group’s task and feedback if there is anything that needed. This model works quite well with our group since the result have always been positive and effective. Since we discuss solution to problems and decide any project important milestone opinion and feature. However, we make our group meeting to be 30 minutes to 1 hour long instead of typical Scrum time which is 15 minutes daily.

In case a team member was no able to show up or suddenly disappeared, we will contact using his/her phone number in the contact list we made from the beginning of the semester. If an emergency is happened to eb the case, the tasks will be completed by three remained members, but till week 12. There was similar occurrence of those problems, all the members are still in touch and complete the tasks fully. If there would be a lazy member, we will give a chance, take turns to reprimand him before updating the issue on progress via Messenger and our lecturer.

## Skills and Jobs

In order to take our project to the next step, even to establish a start-up company. Of course, it has many things to do and a lot of tasks need to be handled. Therefore, it requires a lot of responsibilities come from each members of a team. Furthermore, the quality of work should take into consideration because we need to ensure everyone do their work with the best performance and high spirit. Therefore, it has the high demand of human resources to help us to handle that enormous workloads.

# Electrical Engineer

Electricity plays a significant and vital role in all activities of present-day life. The power part is enormous to such an extent that it has enhanced into aspects, for example, industry, electricity gadgets, and mechanics. It additionally assumes a significant job in the general activity of the whole power framework.

Skill required:

* Critical thinking: Comparing different answers for issues will enable him to recognize the best one.
* Reading comprehension: It is necessary to do a great deal of perusing to stay aware of evolving innovation and need to read some relevant documents.
* Communication abilities: Electrical engineer as often as possible work on groups, so incredible verbal correspondence and listening aptitudes are basic.
* Creativity: The good engineer should have the way to think of new thoughts for structuring PCs, gadgets, and peripherals.

Responsibility:

* Structuring, keeping up, executing, or improving electrical instruments, offices, parts, gear items, or frameworks for mechanical and business.
* Playing out a wide scope of building errands by working computer helped plan or designing programming and gear.
* Consulting with clients, specialists, and others to talk about existing or potential building items or undertakings.
* Guaranteeing that establishment and tasks comply with gauges and client prerequisites by getting ready electrical systems blueprints, specialized drawings or land maps.

Qualification:

* Energetic, active and positive thinking
* Be friendly and sociable

Experience:

* Have independent working experience as well as effective teamwork.
* Responsible for the project and complete on time.
* Capable of working under pressure and short-term projects.

# Application Developer

With the developing number of citizens getting to the Internet by means of smartphones and tablets, mobile application development has the extraordinary opportunity to get to an enormous number of potential clients.

Skill required:

* Analytical skills: Application developer needs to comprehend client needs to make applications he needs to utilize.
* Communication: Application developer should have the way to pose the correct inquiry of the customer to increase a comprehension of what the customer needs and needs. He additionally needs to realize how to offer guidelines of specialized ideas in clear, straightforward language to colleagues or customers.
* Creativity: As an application developer, he needs to compose clean code to make applications that are easy to use. Application developer ponder how clients join their smartphones into their lives, and afterward manufacture applications that assist them with finishing different errands. This activity includes tech aptitudes, yet in addition a receptive outlook.
* Critical thinking: As an application developer, a major aspect of responsibilities will be investigating issues with applications on Android or iOS stages.
* Programming Languages: Knowledge of a various kind of programming language is compulsory. Apple iOS designers for the most part utilize Objective-C, and Android engineers normally use Java and React Native.

Responsibility:

* Developing programming explanation to address client issues.
* Creating and actualizing the source code of new applications.
* Analyzing source code and troubleshooting code.
* Evaluating existing applications and performing updates and alterations.
* Developing specialized guidebooks to show the structure and code of new applications.

Qualification:

* Energetic, active and positive thinking.
* Be friendly and sociable.

Experience:

* Have independent working experience as well as effective teamwork.
* Good working attitude and adapt quickly to different situations.

# AI developer

Numerous ordinary impacts of artificial intelligence are adjusting the way our everyday experience look. There is no doubt that artificial intelligence is a vital piece of our daily lives.

Skill required:

* Mathematics: An AI developer should have the level of expertise in mathematics to deal with the complex data.
* Data science & statistics: It is required for AI developer to have the skill same as Data Scientist in order to work as the team.
* CS & Programming: Most demanding computer language is Python and necessary for AI developer.
* CI/CD & SDLC knowledge: The huge workloads require the one who willing to work in software development life cycle effectively.

Responsibility:

* Mechanize framework utilized by the Data Science group.
* Convert AI models into APIs with the goal that different applications can access them.
* Test and deploy models.
* Create least applicable items dependent on AI.

Qualification:

* Energetic, active and positive thinking
* Be friendly and sociable.

Experience:

* Have independent working experience as well as effective teamwork.

# Project Manager

Project manager is the one who assures the professionalism and quality of the entire system in the customers' more important systems. Furthermore, he will keep the process of project on schedule and on a right path.

Skill required:

* Leadership: It is important to inspire others, set the vision and lead the team effectively.
* Risk management: When it turns to the more complex, transformative and unique project, it requires the project manager who able to control risks.
* Project scheduling: It is the core ability of the good project manager.
* Negotiation: It is not always the project goes smoothly, sometimes it need the person who can resolve conflict.

Responsibility:

* Calculate and characterize the project's aims and goal.
* Prepare resources required and oversee resources in an adequate and proficient way.
* Prepare spending plan dependent on extent of work and resources prerequisites.
* Track spending plans so as to meet spending plan.
* Develop and deal with complex timetable and work plan.

Qualification:

* Energetic, active and positive thinking.
* Be friendly and sociable.

Experience:

* Have independent working experience as well as effective teamwork.
* Work effectively with different people.

## Feedback

# Võ Gia Bảo

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Task | Progress | Attitude | Punctuality | Opinion |
| Vo Gia Bao | 1.Research and resolve the Adafruit libraries for the project.  2.Git flow and manage GitHub repository  3.JavaScript functions for group's website,  4. Write group reflection and feedback | Deadline Team  Feedback: 30 /12  Group reflection: 31/12  Technical Deadlines:  Report deadlines:  Aims, plan and progress: 3/1  Roles, testing, skills and jobs, tools and technologies, risks: 4/1  Timeframe final: 5/1    **All tasks have been completed on time.** | Attend group meetings actively and on time. Finish given tasks before the due day at an acceptable level.  Having a positive attitude when dealing with the workload. | We do not do that here. However, the heavy workload of the final assignment was the reason for the near punctuality | Performance and communication skills were improved. Pay more attention to learning and team working. However, finding learning resources skill was not so good. |
| Vo Thanh Luan | 1.Write tools and technologies  2. Create and modify a website  3. Write group reflection and feedback  4. Write project ideas (tool, skill required )  5. Double check the content and spelling.  . | Very hard-working. Enthusiasm in learning tools to develop website. Having a strong enthusiasm on doing group website. Positively receive jobs. | His technical skills were improved dramatically by self- learning. He has a positive attitude when dealing with difficult exercise. He actively asked  teammates when the tasks were unclear. The soft skills such as communication were enhanced. |
| Tran Dang Bao Nhi | 1. Writing project description part including aims, plan and progress, timeframes and roles, group processes and communication  2. Write Group reflection and feedback  3. Write project idea – Abstract and conclusion  4. Description on group website  5. Write group reflection and feedback  6. Finalizing report content | Did the research very well. Positively invest time and effort in the group reports. Actively separate the project into several simple parts. Having a sense of empathy with the group’s members. | She tried her best in learning technical skills and coding. She could make a reasonable and logic way to solve the problems and assignments. She considered the emotional aspects of the team members carefully. Her learning style is learning via asking. She applied this learning style constantly. |
| Huynh Ngoc Tuyen | 1.Cutting and soldering LED strips  2. LEDs remapping  3. Coding and programming  4.Testing and debugging  5.Writing Feedback and Group Reflection  6. Report formating  7. Resolve physical issues | Be patient in reading documentations and libraries. Be active in doing external exercises. Actively receive and be responsible core tasks. | His determination in programming is impressed. He can code several hours constantly. Although dealing with the exercises and tasks quickly, the quality of his products was above the acceptable level. He can give constructive approaches in the code of the team members |

# Võ Thành Luân

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| Name | Task | Progress | Attitude | Punctuality | Opinion |
| Vo Gia Bao | 1.Research and resolve the Adafruit libraries for the project.  2. Coding and programming  2.Git flow and manage GitHub repository  3.JavaScript functions for group's website,  4. Write group reflection and feedback | Deadline Team  Feedback: 30 /12  Group reflection: 31/12  Technical Deadlines:  Testing components: 15/12  Mapping LEDs: 4/1  Main  Report deadlines:  Aims, plan and progress: 3/1  Roles, testing, skills and jobs, tools and technologies, risks: 4/1  Timeframe final:  5/1  7/1: Finalizing the report | Taking part in discussions and effectively going to meeting. Having great conduct and genuine on doing tasks with excitement and dynamic | Be on time and on schedule, never leaving tasks unfinished. | He is excited about his own learning, listens carefully, and attempts to avoid interruptions that could interfere with the learning system. However, he shows irrelevant trust in his writing aptitudes and may prompt his impression of low self-assurance in his writing ability. |
| Vo Thanh Luan | 1.Write tools and technologies  2. Create and modify a website  3. Write group reflection and feedback  4. Write project ideas (tool, skill required )  5. Double check the content and spelling. | Deadline Team  Feedback: 30 /12  Group reflection: 31/12  Technical Deadlines:  Testing components: 15/12  Mapping LEDs: 4/1  Main  Report deadlines:  Aims, plan and progress: 3/1  Roles, testing, skills and jobs, tools and technologies, risks: 4/1  Timeframe final:  5/1  7/1: Finalizing the report | Show eagerness for adapting new thing.  Displays a positive viewpoint and behavior in the study hall. | Great at managing schedule so I never miss deadlines, enthusiasm and passionate for my tasks. | I accept that I am a dependable and solid individual, seeks after direction enough, and completes without anyone else duties to myself just as different individuals. Nonetheless, my writing pieces do not have a fascinating lead that catches the reader's eye. |
| Tran Dang Bao Nhi | 1. Writing project description part including aims, plan and progress, timeframes and roles, group processes and communication  2. Write Group reflection and feedback  3. Write project idea – Abstract and conclusion  4. Description on group website  5. Write group reflection and feedback  6. Finalizing report content | Deadline Team  Feedback: 30 /12  Group reflection: 31/12  Technical Deadlines:  Testing components: 15/12  Mapping LEDs: 4/1  Main  Report deadlines:  Aims, plan and progress: 3/1  Roles, testing, skills and jobs, tools and technologies, risks: 4/1  Timeframe final:  5/1  7/1: Finalizing the report | Utilizations instinct to manage matters freely and in a positive manner.  Shows reasonableness in circulating gathering undertakings.  Help to keep the work concentrated and on task. | Keeps up other's expectations of work and never misses even the tightest deadlines. Strictly follow the plan and assist other members to do the same. | She is as often as possible among the first to help and mentor other members. She has a capacity for communicating her musings unmistakably. In any case, wordy sentences here and there make her writing somewhat difficult to peruse since short sentences are simpler to devour and available to all. |
| Huynh Ngoc Tuyen | 1.Cutting and soldering LED strips  2. LEDs remapping  3. Coding and programming  4.Testing and debugging  5.Writing Feedback and Group Reflection  6. Report formating | Deadline Team  Feedback: 30 /12  Group reflection: 31/12  Technical Deadlines:  Testing components: 15/12  Mapping LEDs: 4/1  Main  Report deadlines:  Aims, plan and progress: 3/1  Roles, testing, skills and jobs, tools and technologies, risks: 4/1  Timeframe final:  5/1  7/1: Finalizing the report | Has an inspirational behavior toward gathering's works. Keep up the adequacy of the undertaking, have a high consciousness of duties and enthusiasm for the assignments. | Presents his reports and projects before time and furthermore guarantees they are precise. | He surpasses desires at applying what he considers in the college to real world and specifically conditions. Despite what might be expected, his own sentences for the most part need semantics making them difficult to fathom. |

# Trần Đặng Bảo Nhi

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| Names | Tasks | Progress | Attitude | Punctuality | Opinion |
| Tran Dang Bao Nhi | 1. Writing project description part including aims, plan and progress, timeframes and roles, group processes and communication  2. Write Group reflection and feedback  3. Write project idea – Abstract and conclusion  4. Description on group website  5. Write group reflection and feedback  6. Finalizing report content | Deadline Team  Feedback: 30 /12  Group reflection: 31/12  Technical Deadlines:  Testing components: 15/12  Mapping LEDs: 4/1  Main  Report deadlines:  Aims, plan and progress: 3/1  Roles, testing, skills and jobs, tools and technologies, risks: 4/1  Timeframe final:  5/1  7/1: Finalizing the report | Enthusiastic and energetic in group activities – provide task fairly for everyone.  Manage the group to meet the deadlines on time.  Helpful in group problem and conflict. Keep the group motivation and connect people together as a group.  Edit and review others part of the project | Keep track on the group work so I have to be the one who finish all the tasks first and have time to review on people’s writing  Follow the plan of each section and keep the punctuality ò the group since last time we were not good at time management and did not have much time to edit our report. | Apparently, I have to admit that it is hard for one to give feedback about themselves.  I think I did much better this time on my time control and task done with better quality.  Things I did good is keeping the track of team and always make all members engaged in the group and their tasks.I fixed many problems thtat our group face with the contrucstive feedback from the teacher.  Overall, I still have many things to learn for the next project. |
| Huynh Ngoc Tuyen | 1.Cutting and soldering LED strips  2. LEDs remapping  3. Coding and programming  4.Testing and debugging  5.Writing Feedback and Group Reflection  6. Report formating  7. Resolve physical issues | Deadline Team  Feedback: 30 /12  Group reflection: 31/12  Technical Deadlines:  Testing components: 15/12  Mapping LEDs: 4/1  Main  Report deadlines:  Aims, plan and progress: 3/1  Roles, testing, skills and jobs, tools and technologies, risks: 4/1  Timeframe final:  5/1  7/1: Finalizing the report | Positive attitude and good behavior  Creative in problem solving issues Always show respect to other perception  High responsibility on group tasks and always notice people on the next to do list.  Keep the group effectiveness of the project.  He helps other with his knowledge and always thrive to learn more, he is supportrive and nice | Finnish the tasks always before the deadlines with great job and careful research  Be present on time with every group meeting. | I think Tuyen is an introvert but he is active and energetic in group’s work and always give comments and feedback. He give constructive, effective comments and ideas on his team and review the report also. Tuyen is always a helping hand to group members whenever it comes to a problem that is in his solving ability.  Overall Tuyen increase the group well collaboration and be supportive member of the group. He always done his task greatly with effort and responsibility |
| Vo Thanh Luan | 1.Write tools and technologies  2. Create and modify a website  3. Write group reflection and feedback  4. Write project ideas (tool, skill required )  5. Double check the content and spelling. | Deadline Team  Feedback: 30 /12  Group reflection: 31/12  Technical Deadlines:  Testing components: 15/12  Mapping LEDs: 4/1  Main  Report deadlines:  Aims, plan and progress: 3/1  Roles, testing, skills and jobs, tools and technologies, risks: 4/1  Timeframe final:  5/1  7/1: Finalizing the report | Responsible, cooperative and active in group tasks – ask question carefully on what to do and the requirements.  Hard-working and make great contribution  Done his tasks with great effort and good quality – group web Good behavior with positive viewpoint on problem and try to solve the problem.  He listens to others opinion and fix his tasks if it is good and necessary | Done the tasks always before the deadlines with great report and well-formatted answer. He also the one who ask for what to do and remind other on the tasks.  Always available on time in every group meeting. | He is hard – working person with good behavior. Even though he is not a fast learner, Luan did all the tasks with his heart and actively ask if any problem arose or when it came to thing that he is not certain about.  With me, Luan is a good member in a team who have high responsibility on tasks ,great punctuality and high quality with careful research before submit it to group. |
| Vo Gia Bao | 1.Research and resolve the Adafruit libraries for the project.  2. Coding and programming  2.Git flow and manage GitHub repository  3.JavaScript functions for group's website,  4. Write group reflection and feedback  5. Testing and debuging  6. Resolve physical issues | Deadline Team  Feedback: 30 /12  Group reflection: 31/12  Technical Deadlines:  Testing components: 15/12  Mapping LEDs: 4/1  Main  Report deadlines:  Aims, plan and progress: 3/1  Roles, testing, skills and jobs, tools and technologies, risks: 4/1  Timeframe final:  5/1  7/1: Finalizing the report | Behave nicely and active in group work.  Cooperative and supportive in technical problems.  Willing to learn and fix problems.  Doing the task with serious and assertive  Collaborate with Tuyen to do the demo, they had to do a lot of self- learning. | Never leaving the task unfinished after deadlines  Present on the right time at every group meeting. | Bao is an independent person with great technical skills,he is very helpful and give great advices on techniques problem.Learning from the past conflict, our team can now work really well with more understanding on each other, and Bao is quite a good person with listening skills. I found he is helpful and supportive in a team since he also comments good points and built up a team spirit. Bao is active in learning and asking for group tasks and distributions. |

# Huỳnh Ngọc Tuyên

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| **Member** | **Task** | **Progress** | **Attitude** | **Punctuality** | **Opinion** |
| Võ Gia Bảo | 1. Writing project description part including aims, plan and progress, timeframes and roles, group processes and communication  2. Write Group reflection and feedback  3. Write project idea – Abstract and conclusion  4. Description on group website  5. Write group reflection and feedback  6. Finalizing report content | Deadline completions:   * Feedback: 30 /12 * Group reflection: 31/12   Technical Deadlines:   * Testing components: 15/12 * Mapping LEDs: 4/1   Report deadlines:   * Aims, plan and progress: 3/1 * Roles, testing, skills and jobs, tools and technologies, risks: 4/1 * Timeframe final: 5/1 * Finalizing the report: 7/1 | Very creative and agile. Serious in his work and always explore many ways to tackle problems. Always have a positive outlook whenever the group encounters any issue. | Attend weekly group meetings regularly and on-time. Finishes given tasks appropriately and within given time frame. | He is a sociable and outgoing, very easy to be friend with. Very talented and knowledgeable in his own field, though there are doubts in his mind about changing his ideal job, which I think is good. He is not exceptionally good at English but with his hardworking ethics, I can see him improving substantially in the coming years. |
| Võ Thành Luân | 1.Cutting and soldering LED strips  2. LEDs remapping  3. Coding and programming  4.Testing and debugging  5.Writing Feedback and Group Reflection  6. Report formating | Conscientious and thorough with his work. Always seek ways to be better and learn more. Kind and supportive of other groupmates. | He is a hardworking and diligent person. Very easy to work with as a groupmate, though at times he is a bit of a hindrance on the group’s overall work pace. But he is always up for challenges and solve them in the best of his abilities. |
| Trần Đặng Bảo Nhi | 1.Write tools and technologies  2. Create and modify a website  3. Write group reflection and feedback  4. Write project ideas (tool, skill required)  5. Double check the content and spelling. | Hardworking and very good work ethics. She always strives for the better which makes her the suitable leader for our group. She makes sure all work is done in time and helps the group keeps a steady pace. | She is a cheerful and energetic person, which impacts a lot on the group’s overall mood and morale. She is candid in giving feedbacks and receiving them, improve herself upon it. She writes a lot and has many ideas but I think she should improve on her grammatical skills. |
| Huỳnh Ngọc Tuyên | 1.Research and resolve the Adafruit libraries for the project.  2. Coding and programming  2.Git flow and manage GitHub repository  3.JavaScript functions for group's website,  4. Write group reflection and feedback | Dedicated and diligent in his work. I always help my groupmates to make sure their work is up to its highest level. |  |

#### Group Reflection

## Võ Gia Bảo

After nearly 13 weeks of working together, the team working skills of the group members were improved dramatically. The result of my team in terms of researching fields such as writing reports is over expectation. However, the progress of making a product demo is needed to be taken into consideration. One thing that I am surprised about is that the application of calculation and physic skill of our project. The pre-calculation is the most important skill. Our team has calculation the space of each LEDs, rows, columns, and extra gaps. We must remain the symmetry to demonstrate the animations. Which regards physical aspects, we must consider the voltage, the suitable wares, the external libraries, etc. Project management, team working, and communication are the skills that I have learned from the group especially from my teammates.

## Võ Thành Luân

From the beginning till now, this is the 13th week since we work with each other. I discovered that great cooperation between every teammate is the way to achieve in project when time and assets are constrained. As everybody had their very own perspective, a wide range of thoughts could be delivered, and I found the spirit of group participation made me feel progressively enthusiastic about contributing something useful. On the other hand, there is one thing that we could improve is the limitation of word of the report because sometimes write too much is not necessary and maybe make the report too long to read. The thing makes me surprise the most is that in our project, we need to work with a variety of hardware. Because I do not have any experience with these things, I need to self-teach myself in order to engage in group activities. Furthermore, the physical aspect of our project requires that we need to put a lot of effort and time to that in order to finish on time.

## Trần Đặng Bảo Nhi

We work as a group for 13 weeks till now, through a frequently group meeting and discussion, I think that we did well on team collaboration and group reflection since we have done these things weekly. All the group deadlines and work done is on time with careful report and good quality. I learnt much about the other behavior and attitude toward their tasks, all of them are discipline and responsible to the tasks and jobs, which also set a model for me to be more devoted and stricter to my own schedule. The biggest improvement of our group was about the punctuality, which we lacked in the last time. In the week 9th to week 13th , we always were on time on our deadlines both in technical and report teams. We can learn from each other work, and that is what I felt great about, since we divided into 2 groups but remained the collaborative and understanding working environment, which has been beyond my expectation. For instance, Luân and I can have insight about soldering and coding LEDs, and in the other team, Bảo and Tuyên can know more about psychology. We had little to no conflict this assignment since we listen to each other more carefully and respectful.

# Huỳnh Ngọc Tuyên

During our group’s “mini” journey together, starting back in the first assignment up until now, most if not everything went very well and smooth. The group members work in tandem with each other and have great efficiency. One thing we could improve on, from my perspective, is the morale and punctuality. Most of the time, we start with a very positive mood as well as being punctual in group meetings, but this generally decreases over time as the project progresses. We should improve on maintaining a steady pace and leveled morale. One thing that I found surprising is what I have picked up along the way while working on the project. I learnt more about the Arduino, more about LEDs controlling and working with Adafruit’s libraries, etc. which was very interesting and fascinating, as well as surprising. I also learnt a lot about team working, collaboration and effective communications with the group as well as project management. From my groupmates, I know how to be expressive with my ideas and improve myself upon receiving feedbacks.