Internship Report

B.Eng. in Software Engineering, Academic Year 2017/2018

International College, King Mongkut’s Institute of Technology Ladkrabang

By 58090002 Damian Satya Wibowo

Internship period : 2018 June 04~2018 August 09 (*35 days, 315 hours)*

# Company outline

## Company name and address

Company Name: PT Tigaresi Bangun Nusaperdana (TBN)

Office Address: (Indonesian) Jalan Sidomukti No. 56, Kecamatan Sukaluyu, Kota Bandung, Jawa Barat, Indonesia 40123

(English) 56, Sidomukti Rd., Sukaluyu Subdistrict, Bandung City, West Java Province, Indonesia 40123

Website: www.tigaresi.com, tigaresi.wordpress.com

The office is a house functioning as the headquarter, as a regular office and manufacturing site.

## Main activities

The company specializes in producing electronics, real-time systems, such as machineries, hardware and software, mainly in embedded system which involves the usage of microcontrollers and microprocessors.

TBN is currently handling …… main projects:

1. IoT
2. Tollgate e-money payment and database system
3. Tollgate vehicle
4. Gas pipe cathodic protection …
5. petrol/gas depot automation

2nd Champion in gas depot effectiveness (world)

*Describe the main activities and/or main products of the company. You may include the company’s vision, philosophy, mission statements, objectives, goals, etc. here.*

## Organization structure

*Describe the organization structure of the company. Provide an organization chart. Provide a brief description of the responsibility of each department in the company. Give an estimate of the total number of employees and the number of employees in each department.*

## Department and supervision

*Provide the name of the department (or division) in the company in which you are doing your internship. Provide the name(s) of your supervisor(s) in the company and their contact information.*

*Supervisors:*

*Mr. Victor P. Limbong +6281321944400*

*Mr. Cortexa Muria +628156028749*

# Internship

## Original description and objectives

Original Project Description:

Participate in the development team to implement or improve automation of Oil Truck Driver

Fit To Work Check system. This activities may cover area such as medical instrument data

acquisition, truck key management, and check in terminal panel.

## Revised description and objectives

The project assigned to me was changed on the first day of the internship by the supervisor. New job description: implementing IoT in an air conditioner to control the air conditioner remotely, publishing the air conditioner’s status and surrounding environment data (temperature, current) online, also logging the sensor data inside a server.

# Software Development

Your internship should involve the development of a piece of software, either as an individual project or as part of a larger software system. This section is for you to summarize the software development process in your internship.

## Background

Provide a summary of the background of the software you developed. This may include:

* Why the software should be developed?
  + The company aims to make their own first IoT system
* Review of similar software in the market
* Who will be the user of the software?
  + Currently, LG AC users, but the scope will be expanded in the near future
* Summary of technical detail required to understand the requirements of the software
* Concise explanation of the software development environment and essential software libraries used in the development

## Software requirement specification

*Provide a clear and concise specification of the requirements of your software. This may include the functional/non-functional requirements of the software, use cases, scenarios, mock-ups, etc.*

## Development team

I developed the planning, all software parts, hardware-software communication and some hardware systems, e.g. connecting modules to Pi. Other hardware works (such as circuit assembly, PCB/board design and manufacture) were provided by the staffs of the company.

## Project plan

Provide the initial project plan and the final revision of the plan. You may include Gantt charts of the project. For each task in the project, give the names of the team members who carried out the task.

## Software design

Describe the final design of the software. You should explain the overview of the design of the software (include diagrams describing the architecture of your software and its context), the decomposition of your software, and then give detailed descriptions of key components of the software. If possible, include the name of the source code file that contains the implementation of each component. You may want to include the following diagrams: package diagrams, component diagrams, class diagrams, sequence diagrams, activity diagrams, E/R diagrams, etc.

## Implementation

### Development tools

1. Hardware  
   1. Main module: Raspberry Pi 3 model B+ (2017)  
   2. Module: IR receiver containing TSOP4838 IR receiver  
   3. Module: IR blaster  
   4. Module: SI7021 humidity and temperature sensor  
   5. Module: AD7124 Analog-to-digital converter (discontinued)

6. Module: ADS1115 Analog-to-digital converter  
7. Module: SCT-013 current sensor  
8. Development board: TBN061807005  
9. Appliance: LG air conditioner model F05NXA

10. Connector: LAN + LAN-to-USB connector

11. Power supplies: (2 pcs. 5V/2A power supplies)

1. Software  
   1. OS: UNIX Raspbian Stretch  
   2. IDE/Editor: Vim Text editor

3. IDE/Editor: Text Editor  
4. IDE/Editor: Sublime Text 3

5. IDE/Editor: Nano Text Editor  
5. Library: mosquitto MQTT (Message Queueing Telemetry Transport)  
6. Library: LIRC (Linux Infrared Remote Control)  
7. Library: WiringPi for controlling GPIO

8. Library: LibCURL for internet connection via C code  
9. Application: XAMPP for building a server

10. Web hosting: 000webhost

11. Database manager: PHPMyAdmin + MySQL

12. Git Repository: GitKraken

13. Documentation: Draw.io

14. Display for Raspberry Pi: VNC Viewer

15. Raspberry Pi Job scheduler: Crontab

1. Programming languages and protocols  
   1. C  
   2. C++ (discontinued)  
   3. HTML5  
   4. JavaScript  
   5. PHP 5.5  
   6. MySQL

7. Python (for testing)

1. Protocols  
   1. MQTT protocol  
   2. LIRC infrared protocol  
   3. Serial Peripheral Interface (SPI) protocol (discontinued)  
   4. I2C protocol

### Techniques

Describe important programming techniques and algorithms in your implementation of the software.

## Testing

Describe how you test your software. Describe how you design your test data and any test script you used. Give examples of test data.

## Screenshots

If the company allows, provide some screenshots depicting key features of your software.

# Achievement

## Summary of work done

Provide a summary of the work you carried out during the internship. If a piece of work is carried out by more than one team members, please explicitly state so. Also give an estimate of the number of lines of code you wrote (not including commented code and, for web pages, not including the content of the web pages).

## Evaluation

Give an honest evaluation of how successfully you achieved your objectives

# Conclusion

## Skills and knowledge learned

Explain what skills and knowledge that you studied in the International College are applied on your work during the internship and how useful are those skills and knowledge. Explain whether you have improved any existing skill and whether you have learned any new skill and knowledge during your internship. What knowledge and experience will you take forward as the most important lessons from your internship?

Explain what publications (books, articles, etc.) and other materials you have studied during the internship and what you learned from those materials.

## Problems and possible improvement

Describe the problems you experienced during your internship. Were there any techniques that you would like to have known before undertaking the internship? Explain how your internship experience could have been improved.

# Acknowledgement

A brief “Thank you” message for the people who helped you during your internship

# Reference

List of publications and other materials referred to in the report

* a brief outline of the company (its size, its main activities, the division or project in which you were employed, etc.);
* the original placement description and objectives (and any later changes to these);
* what you actually did;
* an honest evaluation of how successfully you achieved your objectives;
* a summary of what you learned from working in an industrial environment (for example, tools, techniques, processes, group working, deadlines);
* a reflection on the value of the placement, and how it could have been better.
* What new skills did you learn?
* What existing skills did you exercise or improve during the internship?
* Did your internship experience reinforce your existing knowledge? (Did you observe techniques taught at the International College actually used in practice?)
* Were there any techniques that you would like to have known before undertaking the internship?
* How could the internship experience have been improved?
* What knowledge and experience will you take forward as the most important lessons from your internship?