Prince Mohammad University
College of Engineering
Department of Electrical Engineering
ASSE 4311: Assessment III

RFID Based Child Security System

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Outline :

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- Project Specifications
- Project Architecture
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Project Definition

The project purpose is to design an RFID-based safe transportation and attendance monitoring system for pre-elementary and elementary school going children.

Project Objectives

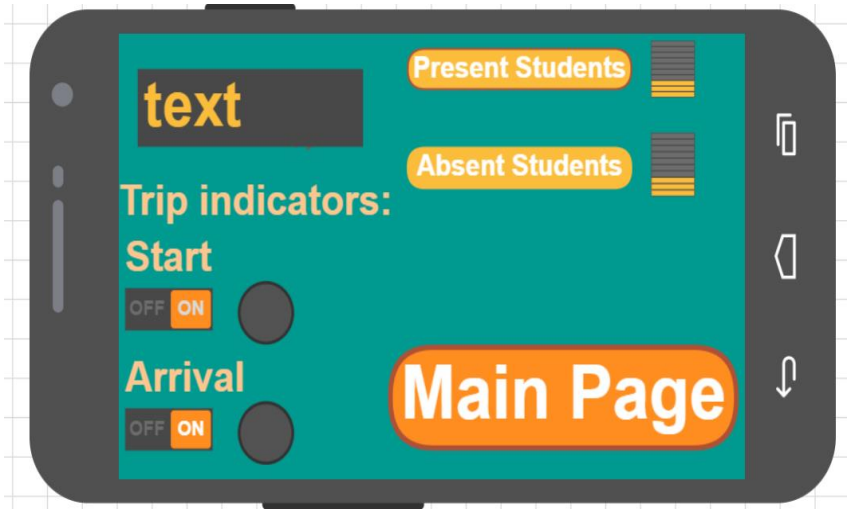
- To assure the safety of young student to be delivered to their destination.
- To save time with more efficiency of taking the attendance.
- To learn about RFID technology and its application in solving real world problem.
- To increase awareness of safety issues.

Project Specifications

- RFID tags can be detected within range of at least 5 meters.
- SMS message with dates and exact time to parents for attendance in school.
- SMS message with dates and exact time to parents for student riding the bus.
- Keep a student record of attendance.
- Notify the bus driver if a student did not leave the bus.
- Using GSM to send SMS.
- RFID reader to detect tags.

Sub-system: Bus

Sub-sub-system#1: User Interface



RemoteXY is a mobile graphical user interface for controller boards to control via Bluetooth, WiFi, Ethernet, or USB.

Sub-sub-system#2: Database

MySQL®

MySQL is the world's most popular open source database web-based applications, used by very popular companies including Facebook, Twitter, YouTube, Yahoo! and many more.

Sub-sub-system#3: RFID Reader

Sub-system: Class

Sub-subs-system#1: User Interface

Blynk is a tech company that develops infrastructure on the internet to use a software to build and manage connected products via WiFi Ethernet, Cellular, Serial USB, Bluetooth.

Sub-sub-system#2: Database

MySQL is the world's most popular open source database web-based applications, used by very popular companies including Facebook, Twitter, YouTube, Yahoo! and many more.

Sub-sub-system#3: RFID Reader

Project Architecture

MySQL

Database

Wi-Fi to Arduino

Wi-Fi

Wi-Fi to Arduino

Wi-Fi

Late

Reader& Tags

Classroom attendance

User interface

Attended

Reader& Tags

Record

Wi-Fi

SMS

GSM

Absent

Reader& Tags

Reader& Tags

In and out exact time

GSM

SMS

Bus

Wi-Fi

Driver user interface

GPS

Speed limit

GSM

SMS

Background: Problem

- Safety transportation of children.
- The wasted time of taking attendance.

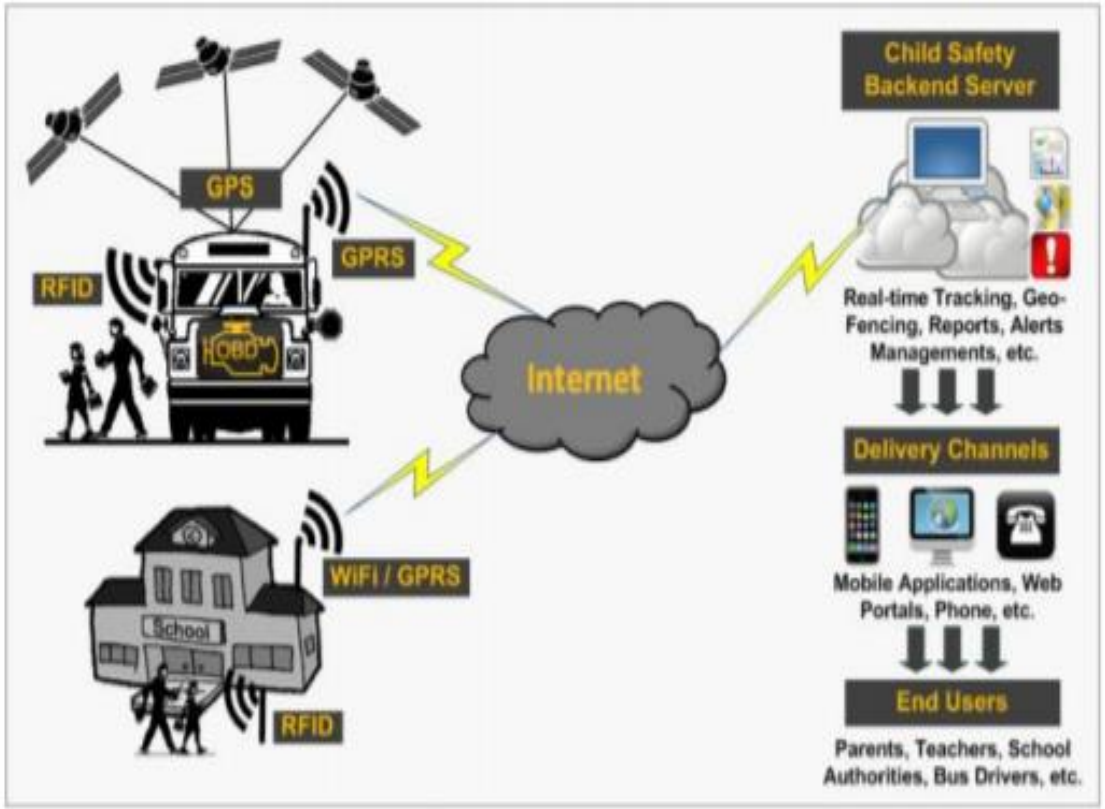
Background: Solutions

- RFID tags in the bus to take a record of students entering and leaving the bus.
- RFID will take attendance automatically.
- GSM will notify parents if their children arrived, or if they were absent.

Previous Projects (1)

Shaaban, K., Bekkali, A., Hamida, E. B., & Kadri, A. (2013). Smart Tracking System for School Buses Using Passive RFID Technology to Enhance Child Safety. *Journal of Traffic and Logistics Engineering*,

- They used passive RFID, GPS, GPRS.
- Date, and exact time of entering and leaving.
- Website for student records.
- SMS 10 minutes before arrival.
- Alarming when there is still a student in the bus.

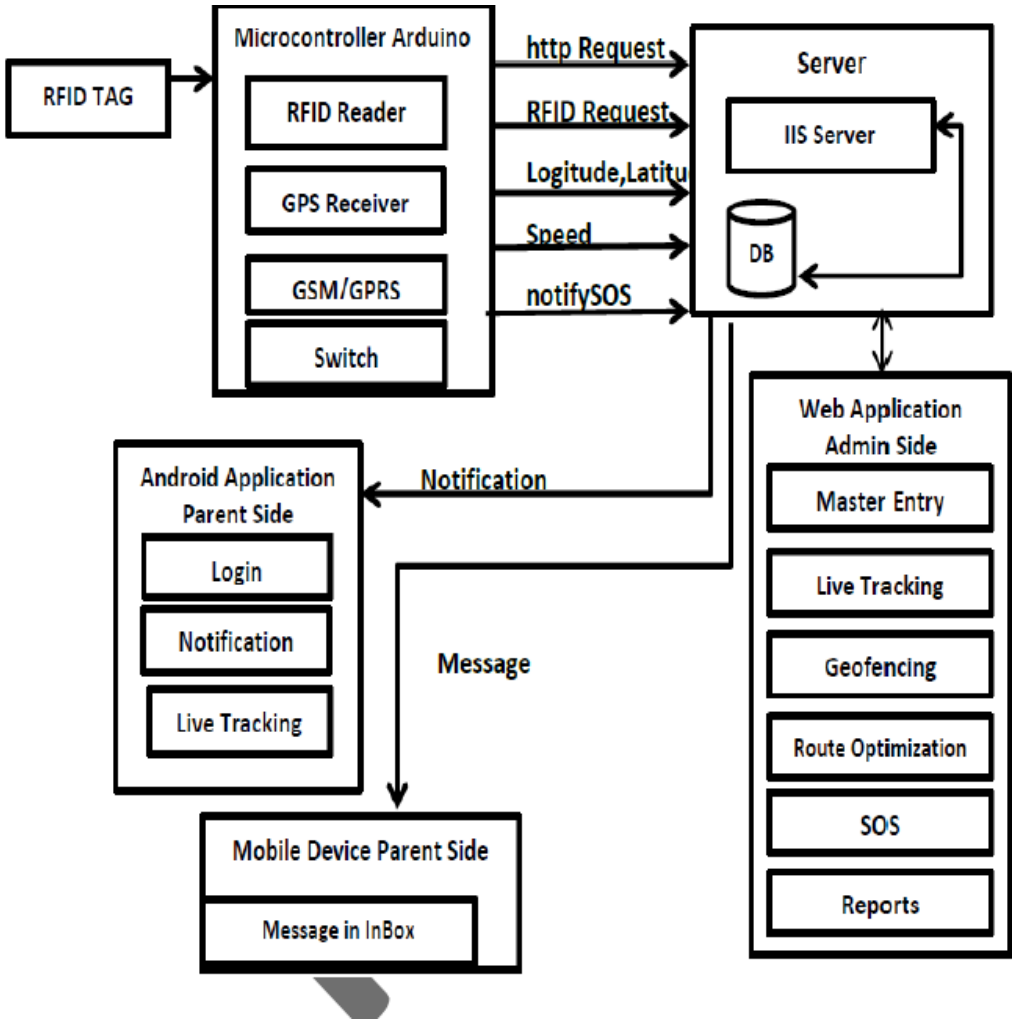


Project Architecture

Previous Projects (2)

Asundkar, V. (2016). Enhance Safety Security and Tracking System For School Bus and Children.

- Used passive RFID, GPS, GSM.
- SMS message to parent when students arrive.
- Alarming when driver exceed 80km/h.
- Switch for danger.
- Android application and website.



Project Architecture

Previous Projects Summary

Projects	1	2	Our Project
GSM	GPRS	√	√
RFID	Passive	Passive	UHF Passive (Bus), Passive (School)
Attendance			√
Bus track	√	√	√
Student record	√	√	√

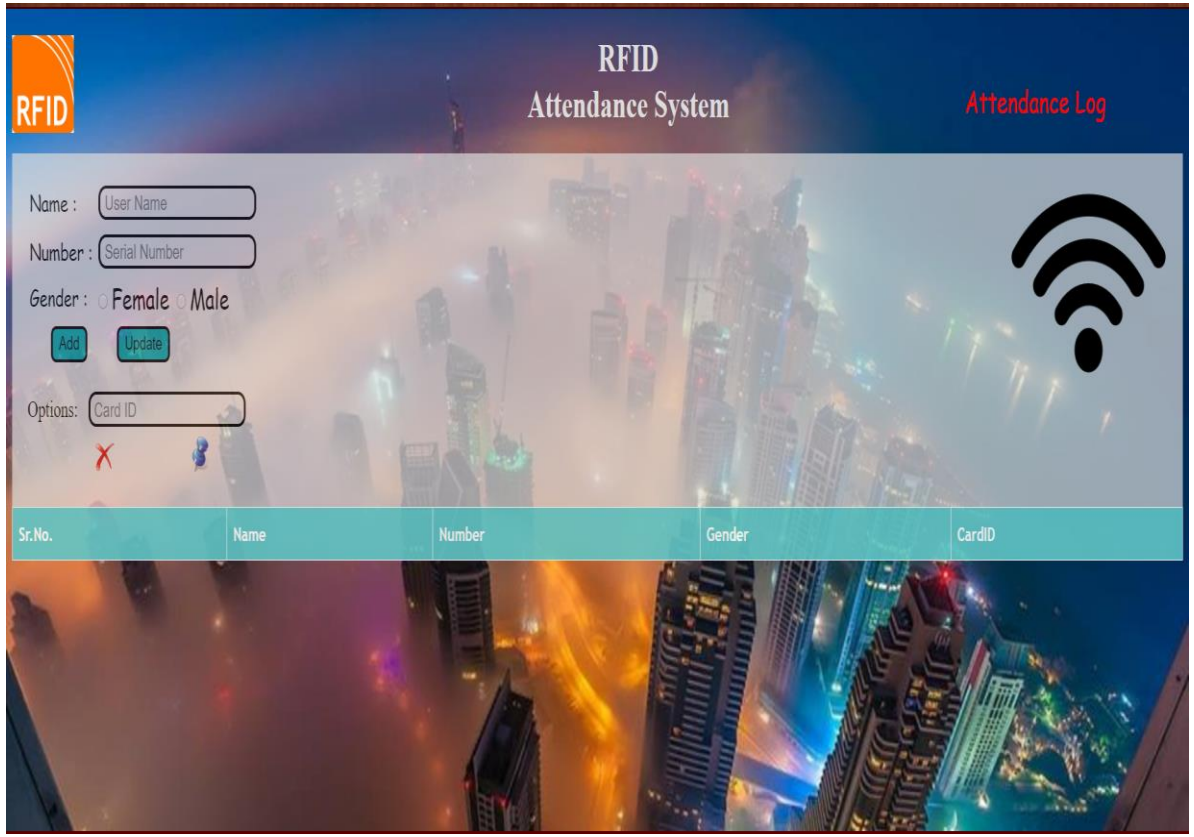
Progress (Database)

Index of /

Name	Last modified	Size	Description
AddCard.php	2020-03-03 01:09	5.9K	
add-users.php	2020-03-03 00:24	913	
connectDB.php	2020-03-03 00:24	465	
export.php	2020-03-03 00:24	1.6K	
image/	2020-03-03 17:18	-	
install.php	2020-03-03 00:24	1.9K	
js/	2020-03-03 00:24	-	
load-users.php	2020-03-03 00:24	966	
nodemculog.sql	2020-03-03 00:24	2.0K	
postdemo.php	2020-03-03 00:24	10K	
user_insert.php	2020-03-03 00:24	11K	
view.php	2020-03-03 00:24	3.9K	

Apache/2.4.41 (Win64) PHP/7.3.12 Server at loginsystem Port 80

Database loginsystem

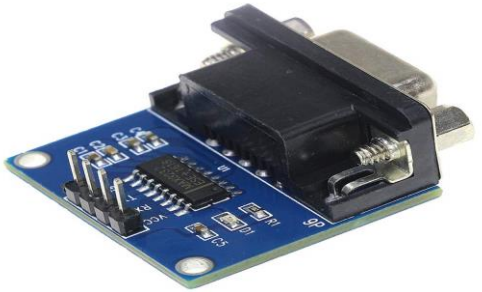


Registering ID's

Progress (RFID Integration)

- Used RS 232 to TTL using MAX 3232.
- Reader communication operation commands.
- The function is used to read the tags IDs including password, EPC, TID, or user memory.

UHF RFID reader



RS232 to TTL

```
const char RdTagAM2[] PROGMEM ={0x53,0x57,0x00,0x0A,0xFF,0x02,0x01,0x02,0x06,0x00,0x00,0x00,0x00,0x42};
const char IDcmd[]    PROGMEM ={0x53,0x57,0x00,0x03,0xFF,0x20,0x34};
```

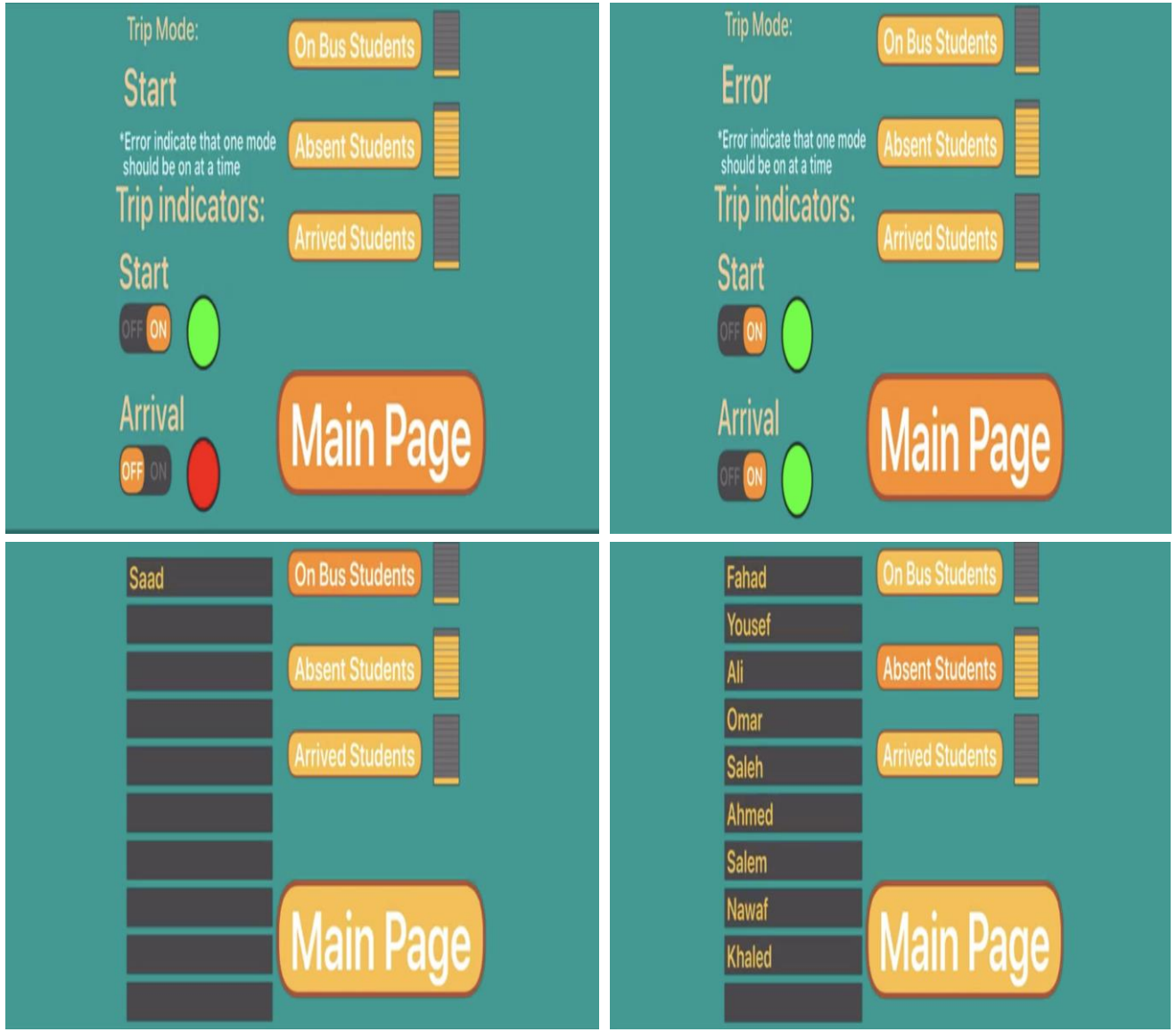
Array of the commands

```
43*54*0*10*0*2*1*E2*0*0*19*6*2*2*4*27*10*9*56*B7*20
read id
E2-0-0-19-6-2-2-4-27-10-9-56-
```

ID readings

Progress (Bus Driver GUI)

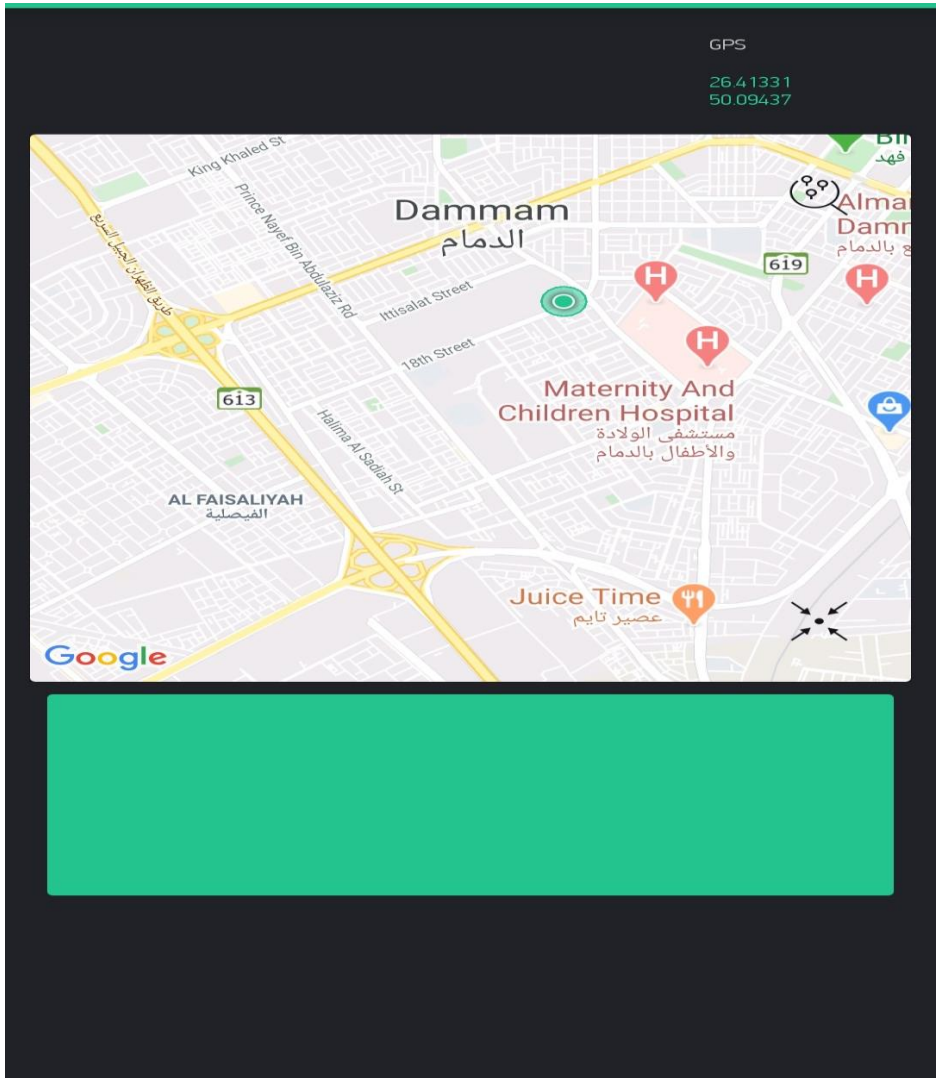
- Ability to pick the trip mode.
- Names of absent, in bus, and arrived students.
- Organized names display.
- Sound when on bus students are more than arrived students.



User interface in RemoteXY

Progress (Parents GUI)

- GPS bus tracking for children on the bus.
- Speedometer that display the speed of the bus on the LCD.



User interface in Blynk

Progress

DATA - Notepad

File Edit Format View Help

```
Khaled , 2020/2/2,22:22
Khaled , 2020/2/2,22:23
Khaled , 2020/2/2,22:22
Fahad , 2020/2/3,22:36
Khaled , 2020/2/3,22:36
Omar , 2020/2/3,22:36
Omar , 2020/3/3,9:18
Ahmed , 2020/3/3,9:23
```

4:29 PM

Khaled Attended At 2020/3/3,16:28

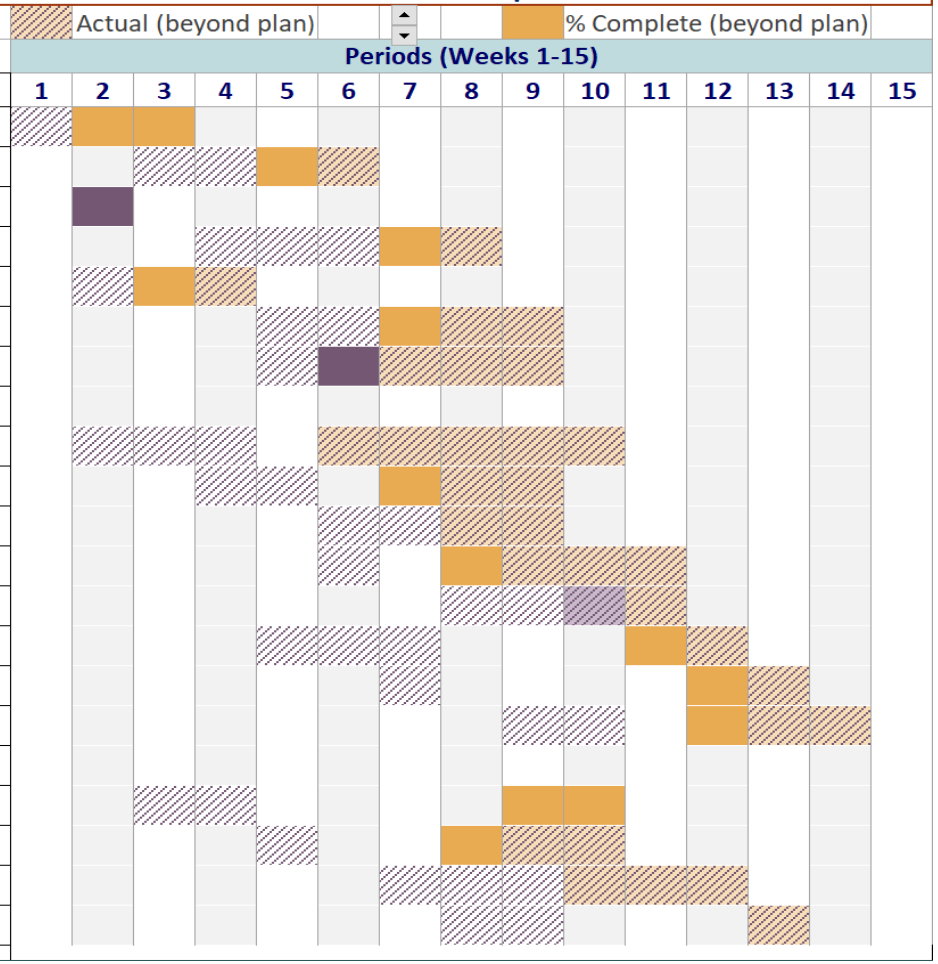
Progress in Summary

- Created attendance system using passive RFID.
- Recorded Students' data in memory.
- Integrate UHF with Arduino.
- Recognize students' ID UHF.
- Started database for school and the bus.
- Created user interface for the bus driver.
- Created user interface for students parents.

Future Work

Title: RFID Based Child Security System	Advisor: Mr. Ahmed Abul Hussain	Design II (ASSE 3)	Spring 2020
Abduliteef Alhamdan 201300803 (AH)		Project PLAN & Progress	
Abdulrahman Baha 201600224 (AB)		ProgRpt No. 2	
Abduliaziz Aldossary 201401219 (AD)		Plan updated (Date): Feb 20, 2020	
Abdulaziz Aljabr 201600140 (AJ)		Instructor: Dr. Sadiq Alhuwaidi	

ACTIVITY	PLAN START	PLAN DURATION	Assigned To	ACTUAL START	ACTUAL DURATION	PERCENT COMPLETE
Sub-system #1 (class)						
Recognize student IDs and save it	1	1	AJ,AB	2	2	100%
Connect to a Wi-fi	3	2	AB	5	2	40%
Adding RTC on Arduino	2	1	AJ	2	1	100%
Design user interface	4	3	AB	7	2	30%
Time comparison	2	1	AD,AH	3	2	40%
Messaging system	5	2	AH	7	3	50%
Send attendance to the data base using Wi-Fi	5	2	AD	6	4	20%
Sub-system #2 (bus)						
Integrate active with Arduino	2	3	AJ,AB	6	5	0%
Look for alternative device	4	2	AB	7	3	30%
Integrate speedometer	6	2	AH	8	2	0%
Recognize Student and save it	6	1	AD	8	4	20%
connect to a Wi-fi	8	3	AJ	10	2	0%
Design user interface	5	3	AH,AH	11	2	20%
Time comparison	7	1	AB	12	2	30%
Messaging system	9	2	AH	12	3	20%
Sub-system #2 (database)						
Consider options	3	2	AB,AJ	9	2	100%
Step-up the database	5	1	AJ	8	3	20%
Save all student information	7	3	AD,AH	10	3	0%
Create communication channel with Arduino	8	2	AD	13	1	0%



Budget Estimate

No.	Description	Quantity	Unit Cost (SR)	Total Cost (SR)
1	RFID tags	20	8	160
2	Reader	2	650	1300
4	GSM	1	180	180
5	Microcontroller	2	120	240
6	Others	NA	150	150
			Totals	2,030

References

- Al-Lawati, A., Al-Jahdhami, S., Al-Belushi, A., Al-Adawi, D., Awadalla, M., & A l-Abri, D. (2015). RFID-based system for school children transportation safety enhancement. 2015 IEEE 8th GCC Conference & Exhibition. Doi:10.1109/ieeegcc.2015.7060047
- Asundkar, V. (2016). ENHANCE SAFETY SECURITY AND TRACKING SYSTEM FORSCHOOL BUS AND CHILDREN. (2016). Retrieved from https://www.ijiert.org/admin/papers/1467308911_ICITER- 16 PUNE.PDF
- Shaaban, K., Bekkali, A., Hamida, E. B., & Kadri, A. (2013). Smart Tracking System for School Buses Using Passive RFID Technology to Enhance Child Safety. *Journal of Traffic and Logistics Engineering*, *1*(2), 191–196. doi: 10.12720/jtle.1.2.191-196
- Singh, Harjeet. (2017). Students attendance management system using RFID and GSM module.

Thank You For Listening

Any Questions?