The Storehouse

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Abstract:

"إن الله يحبُ إذا عِملَ احدُكم عملًا أن يتقنه"

Our team is considered to make the hardware project, because we love to do the Robot and we like to learn more at this field.
This project is a storehouse which is opened when you enter the correct password, if you enter the felid password 3 time the storehouse is not opened forever.

II. Design Rationale

A. Mechanical Design Process

To streamline the design process, Our team used a multi-step approach to allow the team to envision the end result early in the design process, first We imagine the design on our mind, second we sketched it at paper, finally we design our mechanical design at (CADD) files using Solid Works.

https://drive.google.com/open?id=1nwD_RBcQEKAlcon7j6oNCS0cOZxEN4DQ

B. Design Evolution

Next, we design our product by the wood and manufactured at our workshop by mechanical machine such as "disk" to cut the wood, "drill" to make a hull at wood to insert our electronics component & "arct" to make the big hull and design it with the displacement.

C. Electrical Systems

Our electrical system is passed many of steps to design and evaluate it.

First we decided to used an AVR as a microcontroller and we write all the port we use on excel program to don't use the port more than one time.

Resours	MC-Pins	Direc
colum0(Keypad)	PortD0	OUTPUT
colum1(Keypad)	PortD1	OUTPUT
colum2(Keypad)	PortD2	OUTPUT
colum3(Keypad)	PortD3	OUTPUT
Row0(Keypad)	PortD4	INPUT
Row1(Keypad)	PortD5	INPUT
Row2(Keypad)	PortD6	INPUT
Row3(Keypad)	PortD7	INPUT
LCD_RS(LCD)	Pin A0	OUTPUT
LCD_RW(LCD)	Pin A1	OUTPUT
Enable(LCD)	pin A2	OUTPUT
D0(LCD)	pin B0	OUTPUT
D1(LCD)	pin B1	OUTPUT
D2(LCD)	pin B2	OUTPUT
D3(LCD)	pin B3	OUTPUT
D4(LCD)	pin B4	OUTPUT
D5(LCD)	pin B5	OUTPUT
D6(LCD)	pin B6	OUTPUT
D7(LCD)	pin B7	OUTPUT
VSS(LCD)	GND	
VDD(LCD)	5V	
VO(LCD)	5V	
L0(7-SEG)	PIN C0	OUTPUT
L1(7-SEG)	PIN C1	OUTPUT
L2(7-SEG)	PIN C2	OUTPUT
L3(7-SEG)	PIN C3	OUTPUT
L4(7-SEG)	PIN C4	OUTPUT
L5(7-SEG)	PIN C5	OUTPUT
L6(7-SEG)	PIN C6	OUTPUT
.(7-SEG)		
COM.A(7-SEG)	5V	
Motor	PIN A6	OUTPUT
Motor	PIN A7	OUTPUT
RED LED	PIN A3	OUTPUT
GREEN LED	PIN A5	OUTPUT
BUZZER	PIN A5	OUTPUT

Second, we design our circuit at **Protues** program to simulate it and run the code on it.

We used many electronics component such as:-

-Atmega32

-LCD

-KeyPad

-Seven_segment

-DC Motor

-2N2222 Transistor

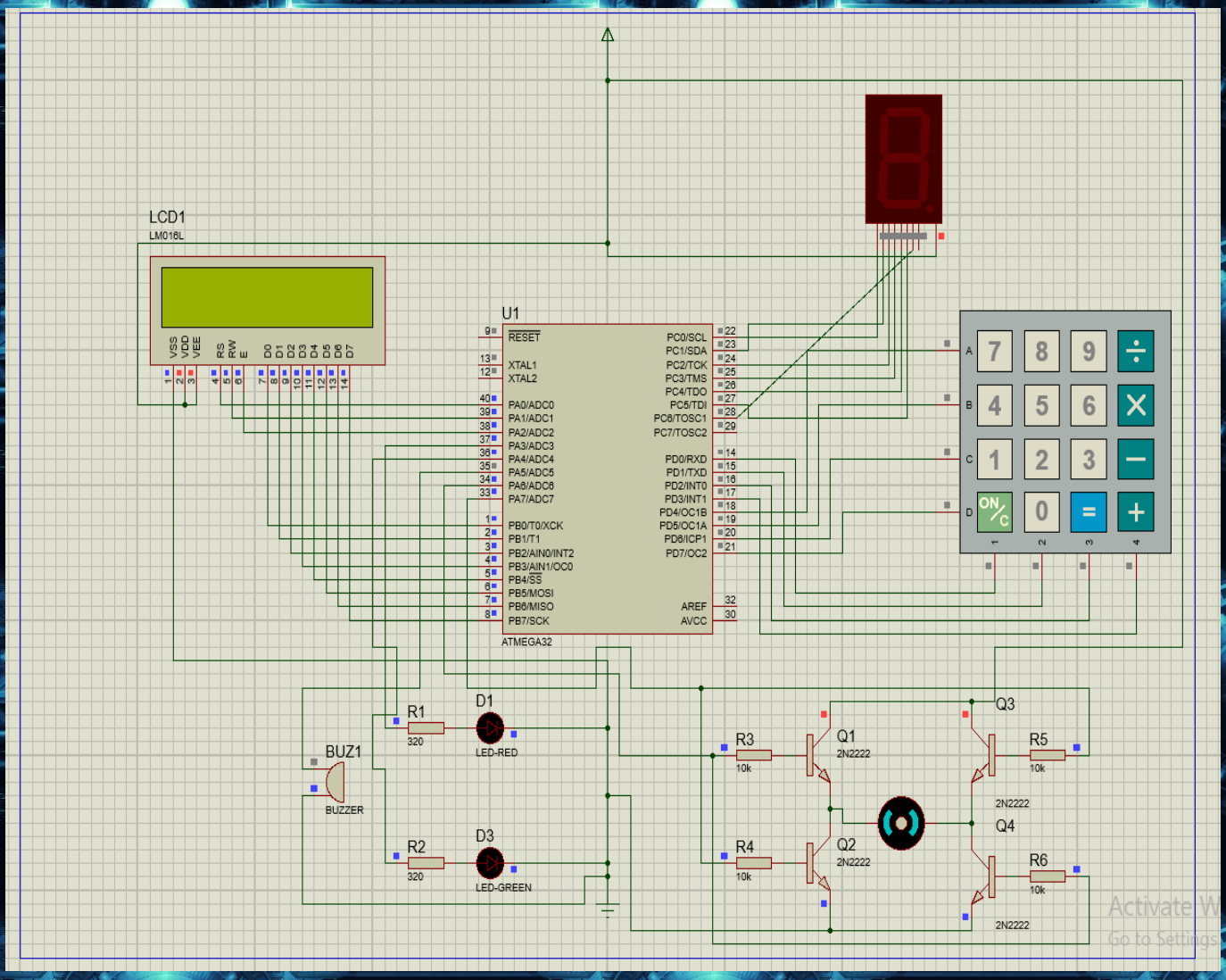
-LEDs

-Buzzer

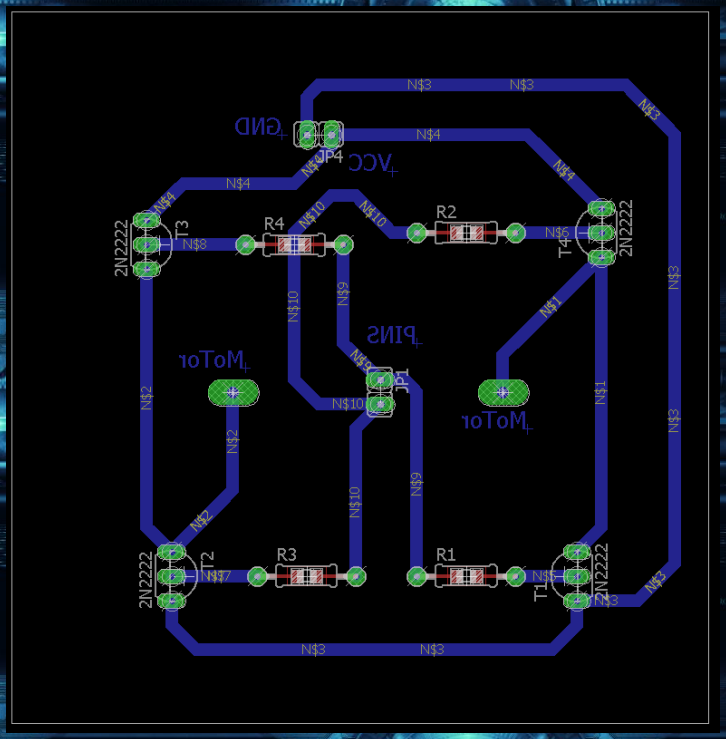
- Potentiometer

-PCBs

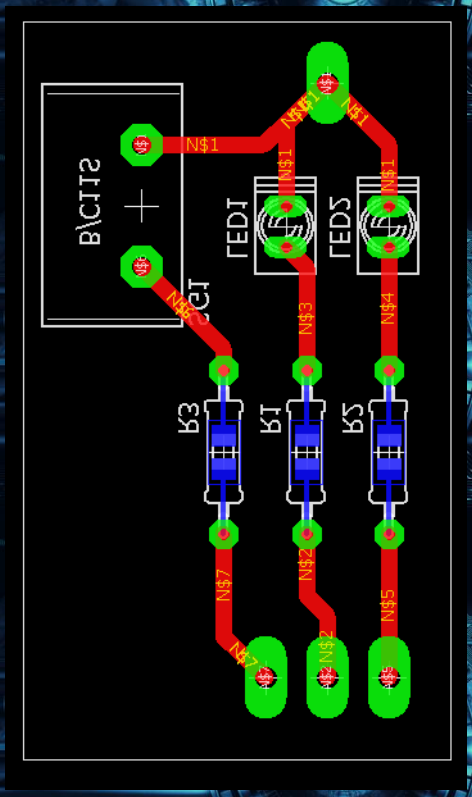
-USBasp Programmer



Then we design our circuit on **EAGLE** program to make the circuit a PCB circuit.



PCB Motor Driver with transistor 2n2222



PCB for 2 LEDs & Buzzer

Finally we print the PCB and it is working ☺

D. Programming

We used the **Assembly AVR** to write our code, we write the code on **ATMEL STUDIO 7.0**.

We used many instructions to write our program.

the instruction

LDI - Load Immediate

LD (LDD) - Load Indirect From data space to Register using Index Z ,X,Y.

LPM - Load Program Memory

MOV - Copy Register

NOP - No Operation

OR- Logical OR

OUT - Store Register to I/O Location

IN - Load an I/O Location to Register

POP - Pop Register from Stack

PUSH - Push Register on Stack

RET - Return from Subroutine

JMP - Jump

RJMP- Relative Jump

SBI - Set Bit in I/O Register

CBI - Clear Bit in I/O Register

SUB- Subtract without Carry

ADD - Add without Carry

ANDI - Logical AND with Immediateand

BREQ - Branch if Equal

BRNE - Branch if Not Equal

CALL - Long Call to a Subroutine

CP- Compare

CPI- Compare with Immediate

Assembly AVR Instructions

Finally the project ended ☺

III. Conclusion

A. Challenge

Our team encountered many challenges from the very beginning until now, the first problem the place to manufacturing our product, we don't find any help at our **Assembly AVR** program in our collage and We do the self-study to making this project this take the large time.

B. Lessons Learned and Skills Gained

"إِنَّا لا نُضِيعُ أَجْرَ مَنْ أَحْسَنَ عَمَلا"

We shall not suffer to perish the reward of any who do a (single) righteous deed."

D. References

AVR Microcontroller and Embedded Systems

https://drive.google.com/file/d/1isQtOipXtDsvJgt9zDKpOq-4FLc_mBrn/view

ATMEL*

http://www.atmel.com/webdoc/avrassembler/avrassembler.wb_instruction_list.html