



GAZİ UNIVERSITY
FACULTY OF ENGINEERING

EEE306 / CENG318 - MICROPROCESSORS PROJECT

ELECTRICAL ELECTRONICS ENGINEERING - COMPUTER ENGINEERING
DEPARTMENTS

INTERDISCIPLINARY WORK REPORT

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1. INTRODUCTION

The purpose of this project is to create different shapes and patterns using 4x4 keypads in the binary number system and 8-bit light patterns. In this project, we aim to use the values read from the 4x4 keypads, which are simple input devices, to generate various shapes and patterns. The binary number system forms the foundation of modern computers, representing numbers using only the digits 0 and 1. In this project, we read values based on this binary system through 4x4 keypads and used these values to create different shapes and patterns. Additionally, we utilized 8-bit light patterns in our project. These patterns consist of sequences of lights that represent specific shapes or patterns. By using these sequences, we are able to generate different light patterns based on the binary values read from the keypads. The objective of this project is to allow users to select different binary values using the keypads and based on these values, produce aesthetically pleasing patterns and shapes. Our project can be seen as a creative fusion of the binary number system and light patterns. Users will be able to choose different binary values through a simple keypad and enjoy the visual spectacle that emerges as a result. Following this introduction, we delved into the details of the project, explaining how we utilized the binary number system and light patterns to create different shapes and patterns.

2. HARDWARE REQUIREMENTS

The hardware requirements to be used in this project require certain components for 4x4 keypads and light patterns to be read and visually presented correctly. Here are the hardware requirements for the project:

- **ARDUINO UNO:** Arduino UNO is a development board that used as the microcontroller in the project. Arduino UNO process the values read from the keypad and control the light patterns.
- **ARDUINO BREADBOARD:** An Arduino breadboard is used for connecting and prototyping the components in the project. It allows for easy connection of components and building the circuit.
- **JUMPER WIRES:** Jumper wires used to establish connections between the components. Arduino require jumper wires to connect the keypad, light modules, and resistors.

- **8 x 220 OHM RESISTANCE:** One 220-ohm resistor used for each LED. These resistors ensured the proper operation of the LEDs with Arduino and help prevent excessive current.
- **8 x LED:** Eight LEDs use to create the light patterns. Each LED illuminated in a specific color and contributed to forming the desired shapes and patterns.
- **4 x 4 KEYPAD:** The 4x4 keypad is the main input device used for reading the binary values. Users select binary numbers using the keypad and control the generated patterns.

3. SOFTWARE REQUIREMENTS

The software requirements for this project involve the following components:

- **Arduino IDE (Integrated Development Environment):** It is the software used to program the Arduino microcontroller. We used the latest version of Arduino IDE for this project.
- **Arduino Libraries:** The Arduino IDE comes with various libraries, and relevant libraries need to be added to control the components used in this project, such as the keypad and LEDs. For example, we used the "Keypad" library for reading the 4x4 keypad.
- **Arduino Programming Language:** The Arduino IDE utilizes the Arduino Programming Language for programming the Arduino microcontroller. In this project, we wrote Arduino code using the Arduino Programming Language to read binary values and control the light patterns.
- **Computer Operating System:** A computer is required to develop the project and program the Arduino microcontroller.

4. COMBINATION OF LIGHT PATTERNS

The definition of light patterns is completed by considering the LEDs as an 8-bit number. These are determined states of light patterns.

'A'	RESET
'B'	1111 1111
'C'	1010 1010
'D'	0101 0101

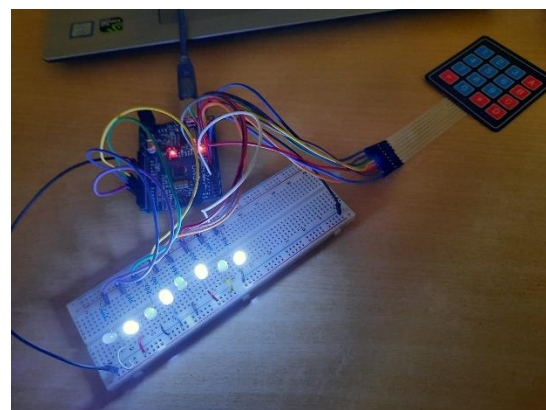
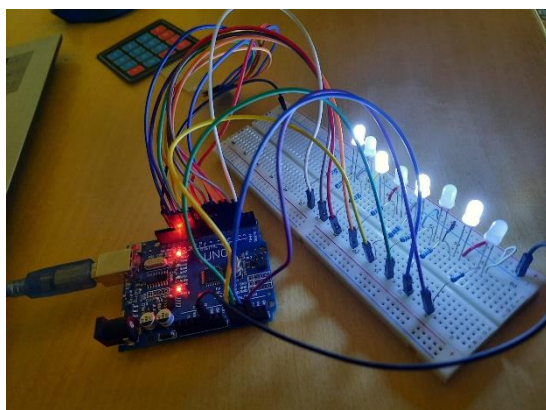
LIGHT PATTERN 1	LIGHT PATTERN 2	LIGHT PATTERN 3
1000 0000	0000 0001	1111 1110
0100 0000	0000 0010	1111 1101
0010 0000	0000 0100	1111 1011
0001 0000	0000 1000	1111 0111
0000 1000	0001 0000	1110 1111
0000 0100	0010 0000	1101 1111
0000 0010	0100 0000	1011 1111
0000 0001	1000 0000	0111 1111

LIGHT PATTERN 5	LIGHT PATTERN 5	LIGHT PATTERN 6
0111 1111	1000 0000	0000 0001
1011 1111	1100 0000	0000 0011
1101 1111	1110 0000	0000 0111
1110 1111	1111 0000	0000 1111
1111 0111	1111 1000	0001 1111
1111 1011	1111 1100	0011 1111
1111 1101	1111 1110	0111 1111
1111 1110	1111 1111	1111 1111
LIGHT PATTERN 7	LIGHT PATTERN 8	LIGHT PATTERN 9
0001 1000	1000 0001	1010 1010
0011 1100	1100 0011	0101 0101
0111 1110	1110 0111	1010 1010
1111 1111	1111 1111	0101 0101
1110 0111	1110 0111	1010 1010
1100 0011	1100 0011	0101 0101
1000 0001	1000 0001	1010 1010
0000 0000	0000 000	0101 0101

LIGHT PATTERN 10	LIGHT PATTERN 11	LIGHT PATTERN 12
0101 0101	0000 0001	1000 0000
1010 1010	0000 0101	1010 0000
0101 0101	0010 0101	1010 1000
1010 1010	0101 0101	1010 1010
0101 0101	1000 0000	0000 0001
1010 1010	1010 0000	0000 0101
0101 0101	1010 1000	0001 0101
1010 1010	1010 1010	0101 0101

5. HARDWARE SYSTEM

This is the final version of the circuit example with hardware part.



6. SOFTWARE FUNCTIONS

```

1  #include <Keypad.h>
2  char key;
3  const byte rows=4;
4  const byte coloums=4;
5
6  int led1=2;
7  int led2=3;
8  int led3=4;
9  int led4=5;
10 int led5=A0;
11 int led6=A1;
12 int led7=A2;
13 int led8=A3;
14
15 char keypad[rows][coloums]=
16 {
17     {'1','2','3','A'},
18     {'4','5','6','B'},
19     {'7','8','9','C'},
20     {'*','0','#','D'}
21 };
22
23 byte rowsPin[rows]={13,12,11,10};
24 byte coloumsPin[coloums]={9,8,7,6};
25
26 Keypad keys = Keypad(makeKeymap(keypad), rowsPin, coloumsPin, rows, coloums);
27
28 void setup(){
29     Serial.begin(9600);
30     pinMode(led1,OUTPUT);
31     pinMode(led2,OUTPUT);
32     pinMode(led3,OUTPUT);
33     pinMode(led4,OUTPUT);
34     pinMode(led5,OUTPUT);
35     pinMode(led6,OUTPUT);
36     pinMode(led7,OUTPUT);
37     pinMode(led8,OUTPUT);
38 }

```

- The code includes the Keypad library, which provides functionality for interfacing with the keypad.
- The key variable is declared as a character to store the pressed key.
- Eight LED pins (led1 to led8) are defined and assigned to specific Arduino pins.
- Two arrays, rowsPin and columnsPin, are defined to store the Arduino pins connected to the rows and columns of the keypad.
- In the setup function, the serial communication is initialized, and all LED pins are set as output pins.


```

39 void loop(){
40     key = keys.getKey();
41     Serial.println(key);
42     if(key=='1'){
43         while(1){
44             digitalWrite(led1,HIGH);
45             delay(500);
46             key = keys.getKey();
47             if(key=='A'){break;}
48             digitalWrite(led1,LOW);
49             digitalWrite(led2,HIGH);
50             delay(500);
51             key = keys.getKey();
52             if(key=='A'){break;}
53             digitalWrite(led2,LOW);
54             digitalWrite(led3,HIGH);
55             delay(500);
56             key = keys.getKey();
57             if(key=='A'){break;}
58             digitalWrite(led3,LOW);
59             digitalWrite(led4,HIGH);
60             delay(500);
61             key = keys.getKey();
62             if(key=='A'){break;}
63             digitalWrite(led4,LOW);
64             digitalWrite(led5,HIGH);
65             delay(500);
66             key = keys.getKey();
67             if(key=='A'){break;}
68             digitalWrite(led5,LOW);
69             digitalWrite(led6,HIGH);
70             delay(500);
71             key = keys.getKey();
72             if(key=='A'){break;}
73             digitalWrite(led6,LOW);
74             digitalWrite(led7,HIGH);
75             delay(500);
76             key = keys.getKey();
77             if(key=='A'){break;}
78             digitalWrite(led7,LOW);
79             digitalWrite(led8,HIGH);
80             delay(500);
81             key = keys.getKey();
82             if(key=='A'){break;}
83             digitalWrite(led8,LOW);
84             key = keys.getKey();
85
86             if(key=='A'){break;}
87         }
88     }
89     if(key=='2'){
90         while(2){
91             digitalWrite(led8,HIGH);
92             delay(500);
93             key = keys.getKey();
94             if(key=='A'){break;}
95             digitalWrite(led8,LOW);
96             digitalWrite(led7,HIGH);
97             delay(500);
98             key = keys.getKey();
99             if(key=='A'){break;}
100             digitalWrite(led7,LOW);
101             digitalWrite(led6,HIGH);
102             delay(500);
103             key = keys.getKey();
104             if(key=='A'){break;}
105             digitalWrite(led6,LOW);
106             digitalWrite(led5,HIGH);
107             delay(500);
108             key = keys.getKey();
109             if(key=='A'){break;}
110             digitalWrite(led5,LOW);
111             digitalWrite(led4,HIGH);
112             delay(500);
113             key = keys.getKey();
114             if(key=='A'){break;}
115             digitalWrite(led4,LOW);
116             digitalWrite(led3,HIGH);
117             delay(500);
118             key = keys.getKey();
119             if(key=='A'){break;}
120             digitalWrite(led3,LOW);
121             digitalWrite(led2,HIGH);
122             delay(500);
123             key = keys.getKey();
124             if(key=='A'){break;}
125             digitalWrite(led2,LOW);
126             digitalWrite(led1,HIGH);
127             delay(500);
128             key = keys.getKey();
129             if(key=='A'){break;}
130             digitalWrite(led1,LOW);
131             key = keys.getKey();
132             if(key=='A'){break;}

```

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- The loop function is where the main logic of the code resides.
- The while loop runs indefinitely, waiting for a key to be pressed.
- When a key is pressed, its value is stored in the key variable and printed to the serial monitor.
- The code then checks which key was pressed using a series of if statements.
- For each key, there is a corresponding block of code that controls the LEDs based on the key press.

- For example, If the key is '1', enter a loop that cycles through the LEDs from led1 to led8, turning them on one at a time for 500 milliseconds. Pressing 'A' breaks the loop and returns to the keypad input.

```

132     }
133 }
134 if(key=='3'){
135     while(3){
136         digitalWrite(led1,HIGH);
137         digitalWrite(led2,HIGH);
138         digitalWrite(led3,HIGH);
139         digitalWrite(led4,HIGH);
140         digitalWrite(led5,HIGH);
141         digitalWrite(led6,HIGH);
142         digitalWrite(led7,HIGH);
143         digitalWrite(led8,LOW);
144         key = keys.getKey();
145         if(key=='A'){break;}
146         delay(500);
147
148         digitalWrite(led8,HIGH);
149         digitalWrite(led7,LOW);
150         delay(500);
151         key = keys.getKey();
152         if(key=='A'){break;}
153
154         digitalWrite(led7,HIGH);
155         digitalWrite(led6,LOW);
156         delay(500);
157         key = keys.getKey();
158         if(key=='A'){break;}
159
160         digitalWrite(led6,HIGH);
161         digitalWrite(led5,LOW);
162         delay(500);
163         key = keys.getKey();
164         if(key=='A'){break;}
165
166         digitalWrite(led5,HIGH);
167         digitalWrite(led4,LOW);
168         delay(500);
169         key = keys.getKey();
170         if(key=='A'){break;}
171
172         digitalWrite(led4,HIGH);
173         digitalWrite(led3,LOW);
174         delay(500);
175         key = keys.getKey();
176         if(key=='A'){break;}
177
178         digitalWrite(led3,HIGH);
179         digitalWrite(led2,LOW);
180         delay(500);
181         key = keys.getKey();
182         if(key=='A'){break;}
183
184         digitalWrite(led2,HIGH);
185         digitalWrite(led1,LOW);
186         delay(500);
187         key = keys.getKey();
188         if(key=='A'){break;}
189     }
190 }
191 if(key=='4'){
192     while(4){
193         digitalWrite(led1,LOW);
194         digitalWrite(led2,HIGH);
195         digitalWrite(led3,HIGH);
196         digitalWrite(led4,HIGH);
197         digitalWrite(led5,HIGH);
198         digitalWrite(led6,HIGH);
199         digitalWrite(led7,HIGH);
200         digitalWrite(led8,HIGH);
201         key = keys.getKey();
202         if(key=='A'){break;}
203         delay(500);
204
205         digitalWrite(led1,HIGH);
206         digitalWrite(led2,LOW);
207         delay(500);
208         key = keys.getKey();
209         if(key=='A'){break;}
210
211         digitalWrite(led2,HIGH);
212         digitalWrite(led3,LOW);
213         delay(500);
214         key = keys.getKey();
215         if(key=='A'){break;}
216
217         digitalWrite(led3,HIGH);
218         digitalWrite(led4,LOW);
219         delay(500);
220         key = keys.getKey();
221         if(key=='A'){break;}
222
223         digitalWrite(led4,HIGH);

```



```

224     digitalWrite(led5, LOW);
225     delay(500);
226     key = keys.getKey();
227     if(key=='A') {break;}
228
229     digitalWrite(led5, HIGH);
230     digitalWrite(led6, LOW);
231     delay(500);
232     key = keys.getKey();
233     if(key=='A') {break;}
234
235     digitalWrite(led6, HIGH);
236     digitalWrite(led7, LOW);
237     delay(500);
238     key = keys.getKey();
239     if(key=='A') {break;}
240
241     digitalWrite(led7, HIGH);
242     digitalWrite(led8, LOW);
243     delay(500);
244     key = keys.getKey();
245     if(key=='A') {break;}
246 }
247
248 if(key=='5') {
249     while(5) {
250         digitalWrite(led1, HIGH);
251         key = keys.getKey();
252         if(key=='A') {break;}
253         delay(500);
254         digitalWrite(led2, HIGH);
255         key = keys.getKey();
256         if(key=='A') {break;}
257         delay(500);
258         digitalWrite(led3, HIGH);
259         key = keys.getKey();
260         if(key=='A') {break;}
261         delay(500);
262         digitalWrite(led4, HIGH);
263         key = keys.getKey();
264         if(key=='A') {break;}
265         delay(500);
266         digitalWrite(led5, HIGH);
267         key = keys.getKey();
268         if(key=='A') {break;}
269         delay(500);
270
271         digitalWrite(led6, HIGH);
272         key = keys.getKey();
273         if(key=='A') {break;}
274         delay(500);
275         digitalWrite(led7, HIGH);
276         key = keys.getKey();
277         if(key=='A') {break;}
278         delay(500);
279         digitalWrite(led8, HIGH);
280         key = keys.getKey();
281         if(key=='A') {break;}
282         delay(500);
283         digitalWrite(led1, LOW);
284         key = keys.getKey();
285         if(key=='A') {break;}
286         digitalWrite(led2, LOW);
287         key = keys.getKey();
288         if(key=='A') {break;}
289         digitalWrite(led3, LOW);
290         key = keys.getKey();
291         if(key=='A') {break;}
292         digitalWrite(led4, LOW);
293         key = keys.getKey();
294         if(key=='A') {break;}
295         digitalWrite(led5, LOW);
296         key = keys.getKey();
297         if(key=='A') {break;}
298         digitalWrite(led6, LOW);
299         key = keys.getKey();
300         if(key=='A') {break;}
301         digitalWrite(led7, LOW);
302         key = keys.getKey();
303         if(key=='A') {break;}
304         digitalWrite(led8, LOW);
305         key = keys.getKey();
306         if(key=='A') {break;}
307         delay(500);
308     }
309 }
310
311 if(key=='6') {
312     while(6) {
313         digitalWrite(led8, HIGH);
314         key = keys.getKey();
315         if(key=='A') {break;}
316         delay(500);
317         digitalWrite(led7, HIGH);
318         key = keys.getKey();
319         if(key=='A') {break;}
320         delay(500);
321         digitalWrite(led6, HIGH);
322         key = keys.getKey();
323         if(key=='A') {break;}
324         delay(500);
325         digitalWrite(led5, HIGH);
326         key = keys.getKey();
327         if(key=='A') {break;}
328         delay(500);
329         digitalWrite(led4, HIGH);
330         key = keys.getKey();
331         if(key=='A') {break;}
332         delay(500);
333         digitalWrite(led3, HIGH);
334         key = keys.getKey();
335         if(key=='A') {break;}
336         delay(500);
337         digitalWrite(led2, HIGH);
338         key = keys.getKey();
339         if(key=='A') {break;}
340         delay(500);
341         digitalWrite(led1, HIGH);
342         key = keys.getKey();
343         if(key=='A') {break;}
344         delay(500);
345         digitalWrite(led1, LOW);
346         key = keys.getKey();
347         if(key=='A') {break;}
348         digitalWrite(led2, LOW);
349         key = keys.getKey();
350         if(key=='A') {break;}
351         digitalWrite(led3, LOW);
352         key = keys.getKey();
353         if(key=='A') {break;}
354         digitalWrite(led4, LOW);
355         key = keys.getKey();
356         if(key=='A') {break;}
357         digitalWrite(led5, LOW);
358         key = keys.getKey();
359         if(key=='A') {break;}
360         delay(500);
361         digitalWrite(led6, LOW);
362         key = keys.getKey();
363         if(key=='A') {break;}
364         digitalWrite(led7, LOW);
365         key = keys.getKey();
366         if(key=='A') {break;}
367         delay(500);
368     }
369 }
370
371 if(key=='7') {
372     while(7) {
373         digitalWrite(led4, HIGH);
374         digitalWrite(led5, HIGH);
375         key = keys.getKey();
376         if(key=='A') {break;}
377         delay(500);
378
379         digitalWrite(led6, HIGH);
380         digitalWrite(led3, HIGH);
381         key = keys.getKey();
382         if(key=='A') {break;}
383         delay(500);
384
385         digitalWrite(led7, HIGH);
386         digitalWrite(led2, HIGH);
387         key = keys.getKey();
388         if(key=='A') {break;}
389         delay(500);
390
391         digitalWrite(led8, HIGH);
392         digitalWrite(led1, HIGH);
393         key = keys.getKey();
394         if(key=='A') {break;}
395         delay(500);
396
397         digitalWrite(led4, LOW);
398         digitalWrite(led5, LOW);
399         key = keys.getKey();
400         if(key=='A') {break;}
401         delay(500);
402
403         digitalWrite(led6, LOW);
404         digitalWrite(led3, LOW);
405         key = keys.getKey();
406         if(key=='A') {break;}
407         delay(500);

```

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316     key = keys.getKey();
317     if(key=='A') {break;}
318     delay(500);
319     digitalWrite(led6, HIGH);
320     key = keys.getKey();
321     if(key=='A') {break;}
322     delay(500);
323     digitalWrite(led5, HIGH);
324     key = keys.getKey();
325     if(key=='A') {break;}
326     delay(500);
327     digitalWrite(led4, HIGH);
328     key = keys.getKey();
329     if(key=='A') {break;}
330     delay(500);
331     digitalWrite(led3, HIGH);
332     key = keys.getKey();
333     if(key=='A') {break;}
334     delay(500);
335     digitalWrite(led2, HIGH);
336     key = keys.getKey();
337     if(key=='A') {break;}
338     delay(500);
339     digitalWrite(led1, HIGH);
340     key = keys.getKey();
341     if(key=='A') {break;}
342     delay(500);
343     digitalWrite(led1, LOW);
344     key = keys.getKey();
345     if(key=='A') {break;}
346     digitalWrite(led2, LOW);
347     key = keys.getKey();
348     if(key=='A') {break;}
349     digitalWrite(led3, LOW);
350     key = keys.getKey();
351     if(key=='A') {break;}
352     digitalWrite(led4, LOW);
353     key = keys.getKey();
354     if(key=='A') {break;}
355     digitalWrite(led5, LOW);
356     key = keys.getKey();
357     if(key=='A') {break;}
358     digitalWrite(led6, LOW);
359     key = keys.getKey();
360     if(key=='A') {break;}
361     digitalWrite(led7, LOW);
362     key = keys.getKey();
363     if(key=='A') {break;}
364     digitalWrite(led8, LOW);
365     key = keys.getKey();
366     if(key=='A') {break;}
367     delay(500);
368 }
369
370 if(key=='7') {
371     while(7) {
372         digitalWrite(led4, HIGH);
373         digitalWrite(led5, HIGH);
374         key = keys.getKey();
375         if(key=='A') {break;}
376         delay(500);
377
378         digitalWrite(led6, HIGH);
379         digitalWrite(led3, HIGH);
380         key = keys.getKey();
381         if(key=='A') {break;}
382         delay(500);
383
384         digitalWrite(led7, HIGH);
385         digitalWrite(led2, HIGH);
386         key = keys.getKey();
387         if(key=='A') {break;}
388         delay(500);
389
390         digitalWrite(led8, HIGH);
391         digitalWrite(led1, HIGH);
392         key = keys.getKey();
393         if(key=='A') {break;}
394         delay(500);
395
396         digitalWrite(led4, LOW);
397         digitalWrite(led5, LOW);
398         key = keys.getKey();
399         if(key=='A') {break;}
400         delay(500);
401
402         digitalWrite(led6, LOW);
403         digitalWrite(led3, LOW);
404         key = keys.getKey();
405         if(key=='A') {break;}
406         delay(500);

```

```

408     digitalWrite(led7, LOW);
409     digitalWrite(led2, LOW);
410     key = keys.getKey();
411     if(key=='A'){break;}
412     delay(500);
413
414     digitalWrite(led8, LOW);
415     key = keys.getKey();
416     if(key=='A'){break;}
417     digitalWrite(led1, LOW);
418     key = keys.getKey();
419     if(key=='A'){break;}
420     delay(500);
421 }
422 }
423 if(key=='8'){
424     while(8){
425         digitalWrite(led1, HIGH);
426         digitalWrite(led8, HIGH);
427         key = keys.getKey();
428         if(key=='A'){break;}
429         delay(500);
430         digitalWrite(led2, HIGH);
431         digitalWrite(led7, HIGH);
432         key = keys.getKey();
433         if(key=='A'){break;}
434         delay(500);
435         digitalWrite(led3, HIGH);
436         digitalWrite(led6, HIGH);
437         key = keys.getKey();
438         if(key=='A'){break;}
439         delay(500);
440         digitalWrite(led4, HIGH);
441         digitalWrite(led5, HIGH);
442         key = keys.getKey();
443         if(key=='A'){break;}
444         delay(500);
445         digitalWrite(led8, LOW);
446         digitalWrite(led1, LOW);
447         key = keys.getKey();
448         if(key=='A'){break;}
449         delay(500);
450         digitalWrite(led7, LOW);
451         digitalWrite(led2, LOW);
452         key = keys.getKey();
453         if(key=='A'){break;}
454         delay(500);

```

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```

456     digitalWrite(led6, LOW);
457     digitalWrite(led3, LOW);
458     key = keys.getKey();
459     if(key=='A'){break;}
460     delay(500);
461
462     digitalWrite(led4, LOW);
463     digitalWrite(led5, LOW);
464     key = keys.getKey();
465     if(key=='A'){break;}
466     delay(500);
467 }
468 }
469 if(key=='9'){
470     while(9){
471         digitalWrite(led1, HIGH);
472         key = keys.getKey();
473         if(key=='A'){break;}
474         delay(500);
475         digitalWrite(led3, HIGH);
476         key = keys.getKey();
477         if(key=='A'){break;}
478         delay(500);
479         digitalWrite(led5, HIGH);
480         key = keys.getKey();
481         if(key=='A'){break;}
482         delay(500);
483         digitalWrite(led7, HIGH);
484         key = keys.getKey();
485         if(key=='A'){break;}
486         delay(500);
487         digitalWrite(led1, LOW);
488         digitalWrite(led3, LOW);
489         digitalWrite(led5, LOW);
490         digitalWrite(led7, LOW);
491         key = keys.getKey();
492         if(key=='A'){break;}
493         digitalWrite(led8, HIGH);
494         key = keys.getKey();
495         if(key=='A'){break;}
496         delay(500);
497         digitalWrite(led6, HIGH);
498         key = keys.getKey();
499         if(key=='A'){break;}
500         delay(500);
501         digitalWrite(led4, HIGH);

```

```

502     key = keys.getKey();
503     if(key=='A'){break;}
504     delay(500);
505     digitalWrite(led2, HIGH);
506     key = keys.getKey();
507     if(key=='A'){break;}
508     delay(500);
509     digitalWrite(led2, LOW);
510     digitalWrite(led4, LOW);
511     digitalWrite(led6, LOW);
512     digitalWrite(led8, LOW);
513     key = keys.getKey();
514     if(key=='A'){break;}
515 }
516 }
517 if(key=='0'){
518     while(10){
519         digitalWrite(led2, HIGH);
520         key = keys.getKey();
521         if(key=='A'){break;}
522         delay(500);
523         digitalWrite(led4, HIGH);
524         key = keys.getKey();
525         if(key=='A'){break;}
526         delay(500);
527         digitalWrite(led6, HIGH);
528         key = keys.getKey();
529         if(key=='A'){break;}
530         delay(500);
531         digitalWrite(led8, HIGH);
532         key = keys.getKey();
533         if(key=='A'){break;}
534         delay(500);
535         digitalWrite(led2, LOW);
536         digitalWrite(led4, LOW);
537         digitalWrite(led6, LOW);
538         digitalWrite(led8, LOW);
539         key = keys.getKey();
540         if(key=='A'){break;}
541         digitalWrite(led1, HIGH);
542         key = keys.getKey();
543         if(key=='A'){break;}
544         delay(500);
545         digitalWrite(led3, HIGH);
546         key = keys.getKey();
547         if(key=='A'){break;}

```

```

548     delay(500);
549     digitalWrite(led5, HIGH);
550     key = keys.getKey();
551     if(key=='A'){break;}
552     delay(500);
553     digitalWrite(led7, HIGH);
554     key = keys.getKey();
555     if(key=='A'){break;}
556     delay(500);
557     digitalWrite(led1, LOW);
558     digitalWrite(led3, LOW);
559     digitalWrite(led5, LOW);
560     digitalWrite(led7, LOW);
561     key = keys.getKey();
562     if(key=='A'){break;}
563 }
564 }
565 if(key=='A'){
566
567     digitalWrite(led1, LOW);
568     digitalWrite(led2, LOW);
569     digitalWrite(led3, LOW);
570     digitalWrite(led4, LOW);
571     digitalWrite(led5, LOW);
572     digitalWrite(led6, LOW);
573     digitalWrite(led7, LOW);
574     digitalWrite(led8, LOW);
575 }
576 }
577 if(key=='B'){
578     while(12){
579         digitalWrite(led1, HIGH);
580         key = keys.getKey();
581         if(key=='A'){break;}
582         digitalWrite(led2, HIGH);
583         key = keys.getKey();
584         if(key=='A'){break;}
585         digitalWrite(led3, HIGH);
586         key = keys.getKey();
587         if(key=='A'){break;}
588         digitalWrite(led4, HIGH);
589         key = keys.getKey();
590         if(key=='A'){break;}
591         digitalWrite(led5, HIGH);
592         key = keys.getKey();
593         if(key=='A'){break;}
594         digitalWrite(led6, HIGH);

```

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```

595     key = keys.getKey();
596     if(key=='A'){break;}
597     digitalWrite(led7,HIGH);
598     key = keys.getKey();
599     if(key=='A'){break;}
600     digitalWrite(led8,HIGH);
601     key = keys.getKey();
602     if(key=='A'){break;}
603 }
604 }
605 if(key=='C'){
606     while(13){
607         digitalWrite(led1,HIGH);
608         key = keys.getKey();
609         if(key=='A'){break;}
610         digitalWrite(led2,LOW);
611         digitalWrite(led3,HIGH);
612         key = keys.getKey();
613         if(key=='A'){break;}
614         digitalWrite(led4,LOW);
615         digitalWrite(led5,HIGH);
616         key = keys.getKey();
617         if(key=='A'){break;}
618         digitalWrite(led6,LOW);
619         digitalWrite(led7,HIGH);
620         key = keys.getKey();
621         if(key=='A'){break;}
622         digitalWrite(led8,LOW);
623         key = keys.getKey();
624         if(key=='A'){break;}
625     }
626 }
627 if(key=='D'){
628     while(14){
629         digitalWrite(led1,LOW);
630         digitalWrite(led2,HIGH);
631         key = keys.getKey();
632         if(key=='A'){break;}
633         digitalWrite(led3,LOW);
634         digitalWrite(led4,HIGH);
635         key = keys.getKey();
636         if(key=='A'){break;}
637         digitalWrite(led5,LOW);
638         digitalWrite(led6,HIGH);
639         key = keys.getKey();
640         if(key=='A'){break;}
641         digitalWrite(led7,LOW);

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```

642     digitalWrite(led8,HIGH);
643     key = keys.getKey();
644     if(key=='A'){break;}
645 }
646 }
647 if(key=='*'){
648     while(15){
649         digitalWrite(led2,HIGH);
650         key = keys.getKey();
651         if(key=='A'){break;}
652         digitalWrite(led4,HIGH);
653         key = keys.getKey();
654         if(key=='A'){break;}
655         digitalWrite(led6,HIGH);
656         key = keys.getKey();
657         if(key=='A'){break;}
658         digitalWrite(led8,HIGH);
659         key = keys.getKey();
660         if(key=='A'){break;}
661         delay(500);
662         digitalWrite(led2,LOW);
663         digitalWrite(led4,LOW);
664         digitalWrite(led6,LOW);
665         digitalWrite(led8,LOW);
666         key = keys.getKey();
667         if(key=='A'){break;}
668         digitalWrite(led1,HIGH);
669         key = keys.getKey();
670         if(key=='A'){break;}
671         digitalWrite(led3,HIGH);
672         key = keys.getKey();
673         if(key=='A'){break;}
674         digitalWrite(led5,HIGH);
675         key = keys.getKey();
676         if(key=='A'){break;}
677         digitalWrite(led7,HIGH);
678         key = keys.getKey();
679         if(key=='A'){break;}
680         delay(500);
681         digitalWrite(led1,LOW);
682         digitalWrite(led3,LOW);
683         digitalWrite(led5,LOW);
684         digitalWrite(led7,LOW);
685         key = keys.getKey();
686         if(key=='A'){break;}
687     }
688 }

```

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```

688     }
689     if(key=='#'){
690         while(16){
691             digitalWrite(led1,HIGH);
692             key = keys.getKey();
693             if(key=='A'){break;}
694             digitalWrite(led3,HIGH);
695             key = keys.getKey();
696             if(key=='A'){break;}
697             digitalWrite(led5,HIGH);
698             key = keys.getKey();
699             if(key=='A'){break;}
700             digitalWrite(led7,HIGH);
701             key = keys.getKey();
702             if(key=='A'){break;}
703             delay(500);
704             digitalWrite(led1,LOW);
705             digitalWrite(led3,LOW);
706             digitalWrite(led5,LOW);
707             digitalWrite(led7,LOW);
708             key = keys.getKey();
709             if(key=='A'){break;}
710             digitalWrite(led2,HIGH);
711             key = keys.getKey();
712             if(key=='A'){break;}
713             digitalWrite(led4,HIGH);
714             key = keys.getKey();
715             if(key=='A'){break;}
716             digitalWrite(led6,HIGH);
717             key = keys.getKey();
718             if(key=='A'){break;}
719             digitalWrite(led8,HIGH);
720             key = keys.getKey();
721             if(key=='A'){break;}
722             delay(500);
723             digitalWrite(led2,LOW);
724             digitalWrite(led4,LOW);
725             digitalWrite(led6,LOW);
726             digitalWrite(led8,LOW);
727             key = keys.getKey();
728             if(key=='A'){break;}}
729     }
730 }

```

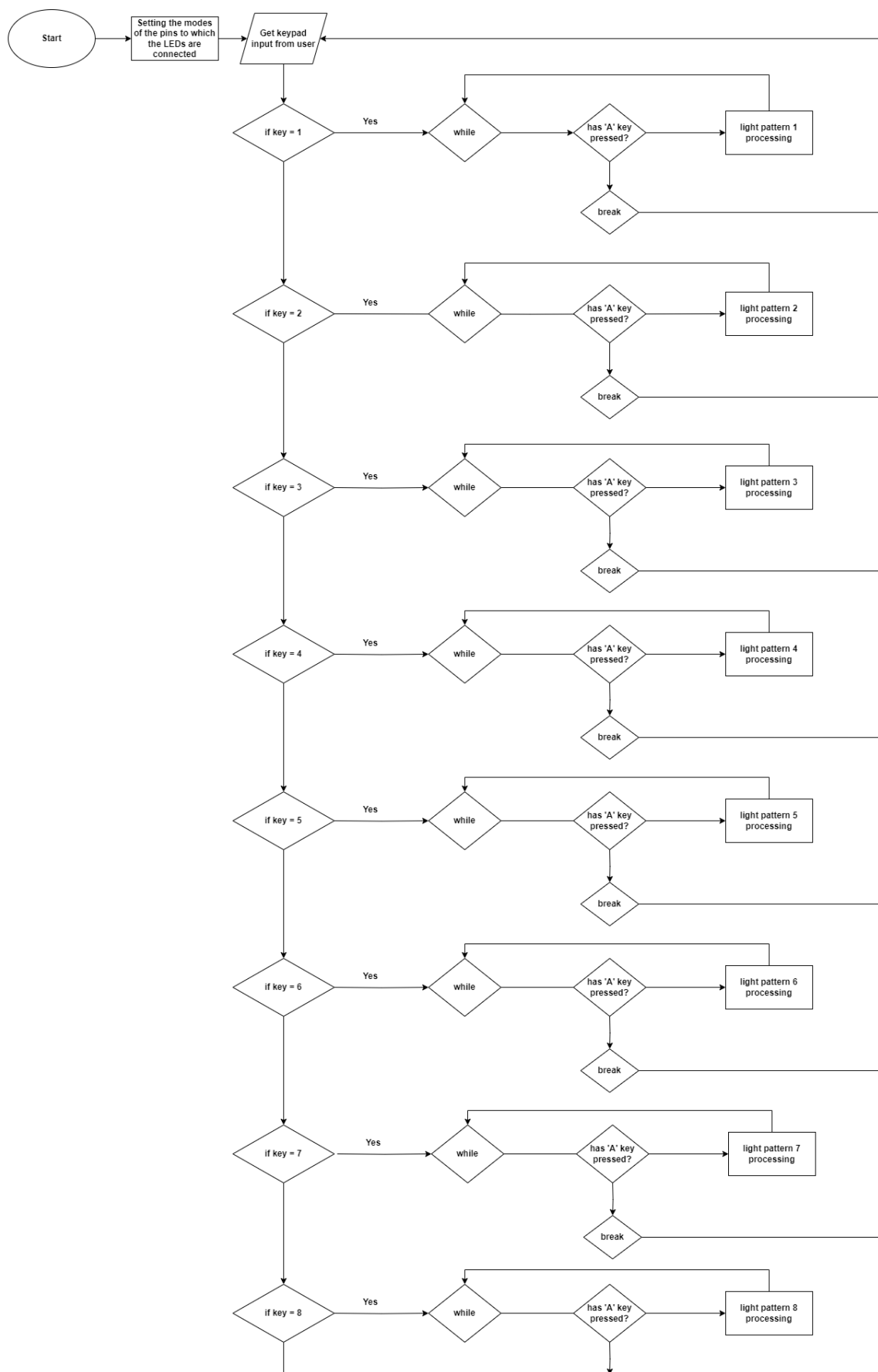


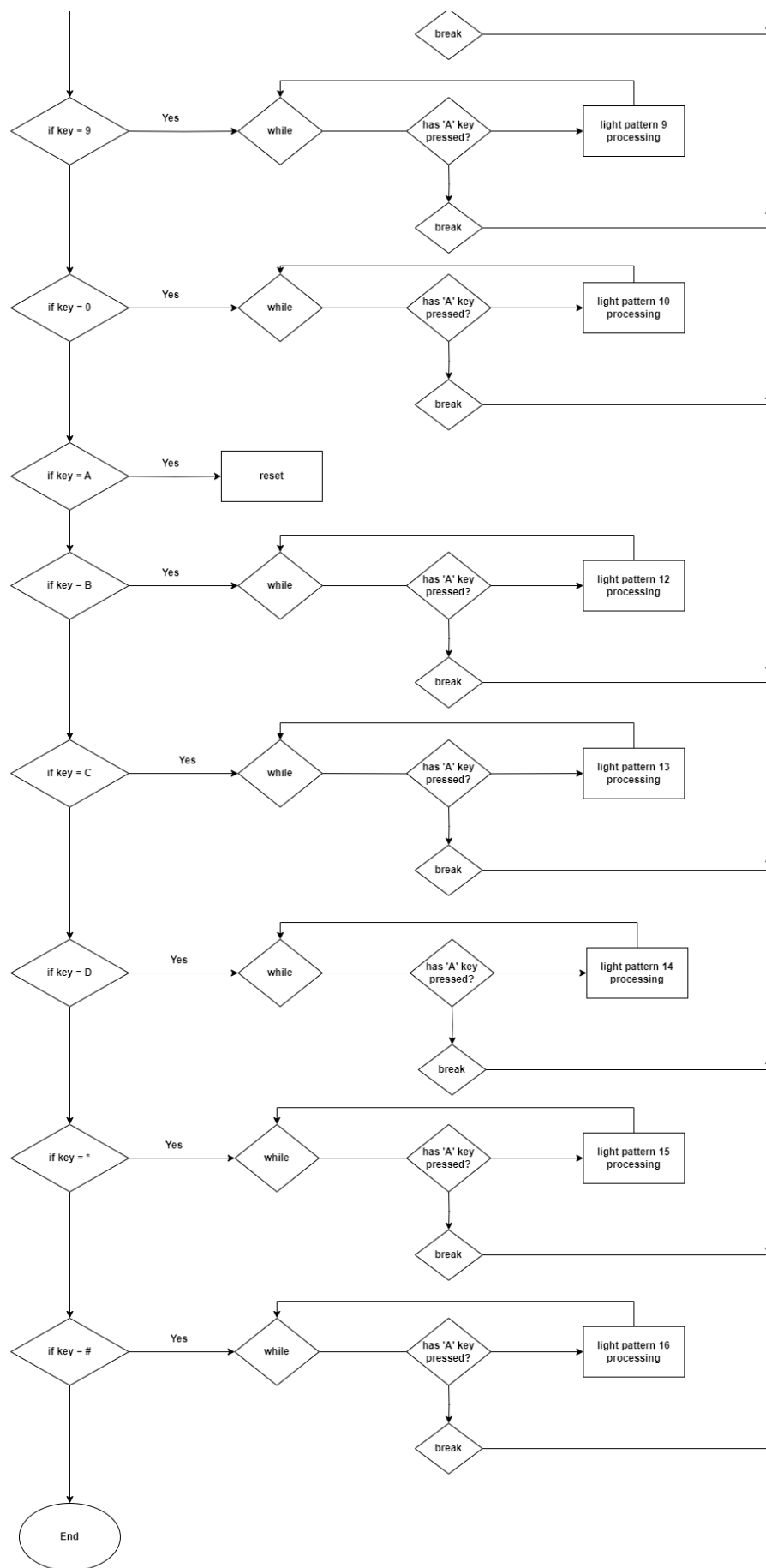
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- The code follows a similar pattern for keys '2', '3', '4', '5', '6', '7', and '8', but with different light patterns.
- The code uses the delay function to create delays between LED changes. It continuously checks for key presses and performs the corresponding actions based on the key value.

Overall, the code allows the user to control the LEDs by pressing different keys on the keypad. The behavior of the LEDs depends on the key pressed and can include different sequences and patterns.

7. FLOWCHART





8. INTERDISCIPLINARY WORK MEETING

4rd Meeting of The Project

Project Topic: Different Light Patterns

Meeting Date: 10.06.2023

Meeting Agenda: On the agenda of the fourth meeting. General evaluations and final touches were made for the project.

Participants

181110059 Fatma Başak ÖZKASAP [Electrical-Electronics Eng.]

Supply of Required Hardware Components, Preparation of the Circuit

C191130040 Metehan ERKAN [Electrical-Electronics Eng.]

Preparation of the Circuit, Running Software on the Board

191180005 Selin Cansu AKBAŞ [Computer Eng.]

Determination of Software Requirements, Program Writing

191180006 Mert AKGÜÇ [Computer Eng.]

Debugging, Program Writing

