INFORMATION SENSORS

LAB WORK REPORT

For Lab Work №2

"Optical Sensors II"

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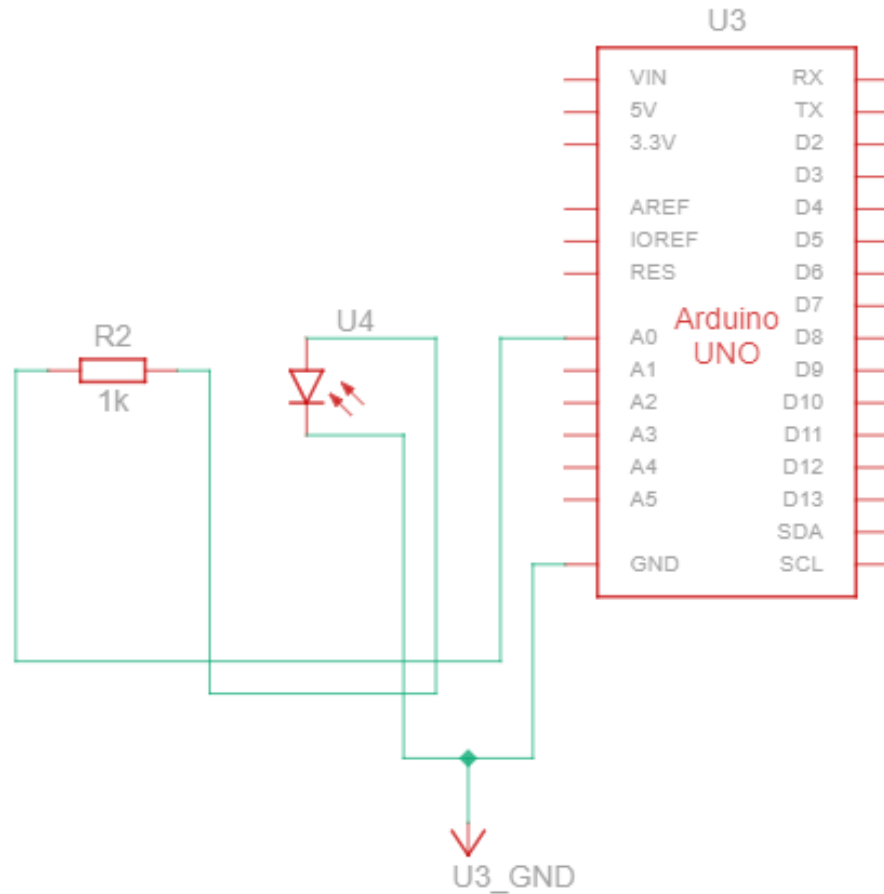2025

Part 1. Photodiodes.

I.   The circuit

Figure 1.1. Circuit with photodiode in photovoltaic mode

II.   Table 1. Light and dark voltage in photovoltaic mode.

#1	Photovoltaic mode
	Photodiode
	Vout, mV
Light	415
Dark	312

III.   Link to a TinkerCAD project:
https://www.tinkercad.com/things/a91HkaNxJYS-lab-work-21?sharecode=gCnMupDSWWBwX8uquA0UrT56Slo4eu0mMjue1Lhx-LE
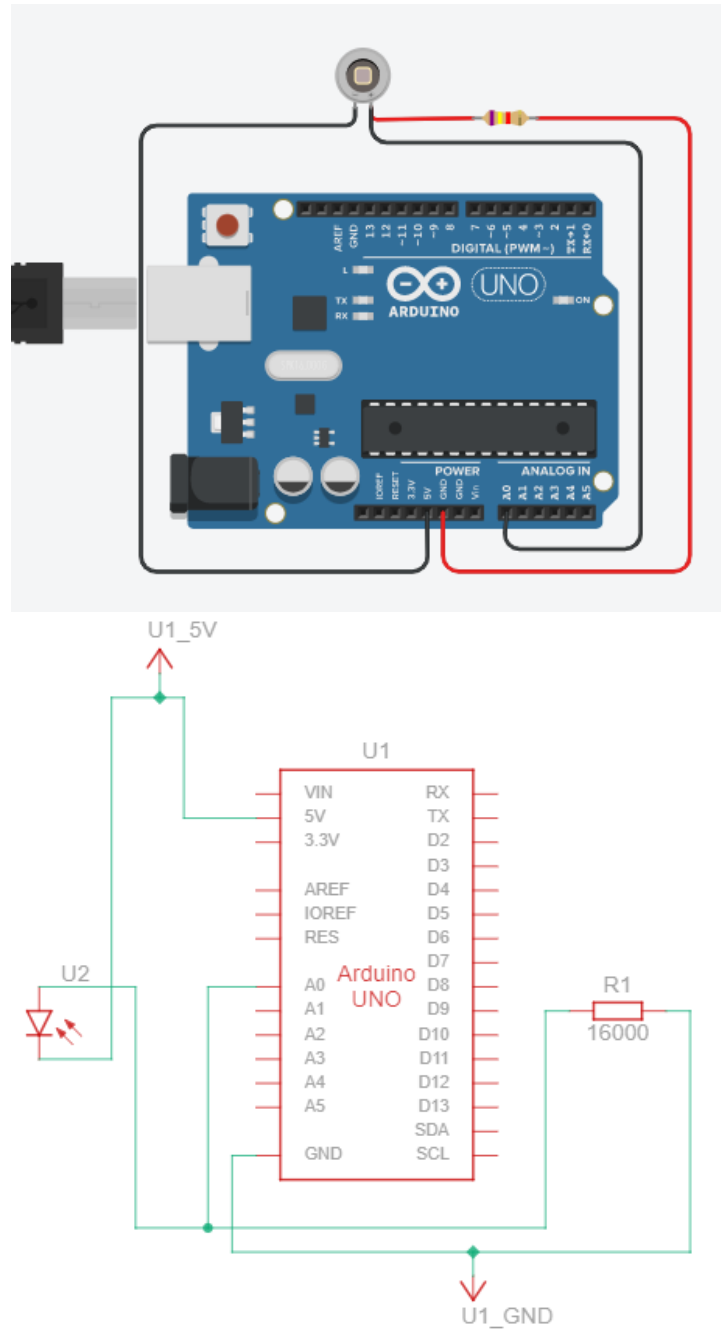
IV. The circuit

Figure 1.2. Circuit with photodiode in conductive mode

V. Link to a TinkerCAD project
https://www.tinkercad.com/things/a91HkaNxJYS-lab-work-21?sharecode=gCnMupDSWWBwX8uquA0UrT56Slo4eu0mMjue1Lhx-LE

Part 2. Phototransistors.
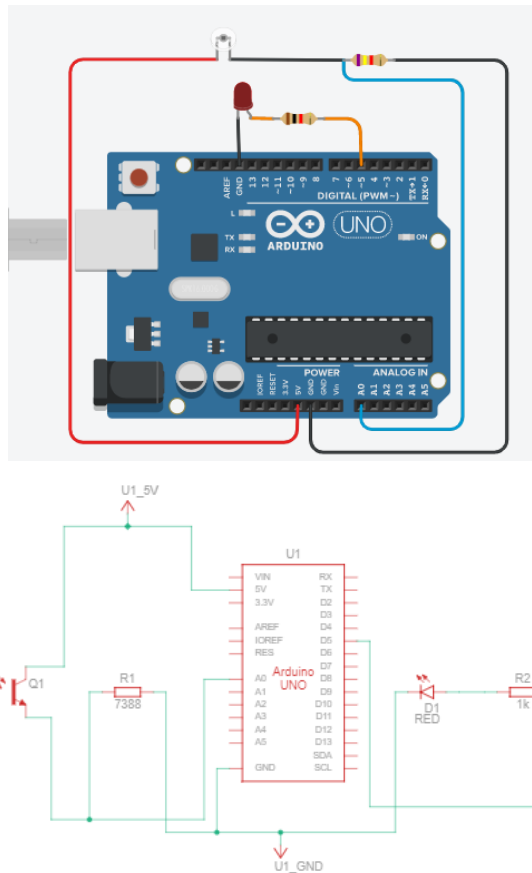
I. The circuit

Figure 2.2. Circuit with phototransistor (final version with LED)

II. The program code

```
1  int Vout = 0;
2  int value = 0;
3  int LED = 5;
4  int brightness = 0;
5
6  void setup() {
7      pinMode(LED, OUTPUT);
8      Serial.begin(9600);
9  }
10
11 void loop() {
12     value = analogRead(0);
13     Vout = map(value, 0, 1023, 0, 5000);
14
15     brightness = map(Vout, 0, 4936, 255, 0);
16
17     analogWrite(LED, brightness);
18     Serial.println(Vout);
19 }
```

Figure 2.2. Modified version of the code (with LED control)

III. Table 2. Voltage ranges of photodiode and phototransistor circuits

#2 R, kΩ (see your variant)	Conditions	Photodiode		Phototransistor	
		Vout, mV	Vrange, mV	Vout, mV	Vrange, mV
500	Light	53	49	1148	1124
	Dark	4		24	
2222	Light	234	225	4828	4726
	Dark	9		102	
3944	Light	410	391	4897	4717
	Dark	19		180	
5666	Light	591	562	4916	4657
	Dark	29		259	
7388	Light	772	733	4926	4584
	Dark	39		342	
9110	Light	948	905	4931	4511
	Dark	43		420	
10832	Light	1124	1071	4936	4438
	Dark	53		498	
12554	Light	1300	1237	4941	4365
	Dark	63		576	
14276	Light	1476	1408	4946	4292
	Dark	68		654	
16000	Light	1652	1574	4946	4208
	Dark	78		738	

VI. Link to a TinkerCAD project:
https://www.tinkercad.com/things/iqMFGUYeYIk-lab-work-22

Part 3. IR sensor.

I.   The circuit
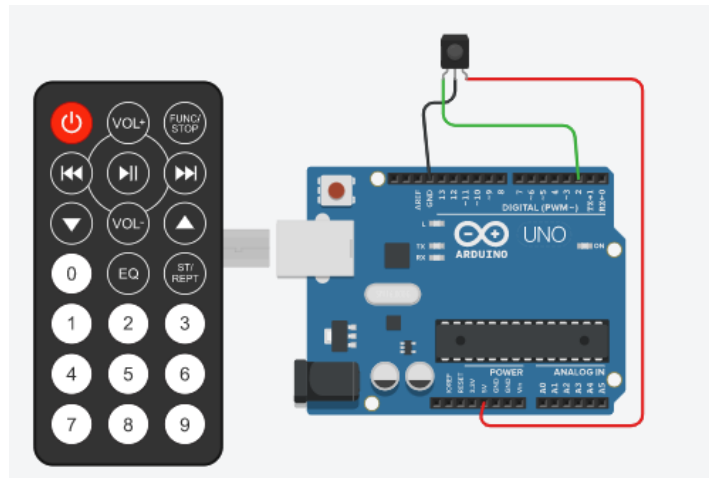
Figure 3.3. Circuit with IR receiver

II.   Table 3. Decoding table for the IR remote

#3	IR Sensor
Button	Value
1	F30CBF00
2	EE11BF00
3	ED12BF00
4	EB14BF00
5	EA15BF00
6	E916BF00
7	E718BF00
8	E619BF00
9	E51ABF00
0	F30CBF00

III.   Link to a TinkerCAD project:
https://www.tinkercad.com/things/15SHF0wAhhx-lab-work-23?sharecode=atSsEt2oinF760yjbobSgasf9pmElS1FX7AFRLmCQgo