AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING

Computer and Systems Engineering Department

Sample Exam II

Second Year – Electrical power and Machines Engineering

2nd Semester, 2021/2022	**Course Code: *CSE 211s***	***Time allowed: 2 Hrs.***

INTRODUCTION TO EMBEDDED SYSTEMS

The Exam Consists of **11** Questions in **2** Pages. ***Maximum Marks: 60 Marks*** **1 / 2**

تعليمات هامة

- حيازة التيلفون المحمول مفتوحا داخل لجنة الأمتحان يعتبر حالة غش تستوجب العقاب وإذا كان ضرورى الدخول بالمحمول فيوضع مغلق فى الحقائب.
- لا يسمح بدخول سماعة الأذن أو البلوتوث.
- لايسمح بدخول أي كتب أو ملازم أو أوراق داخل اللجنة والمخالفة تعتبر حالة غش.

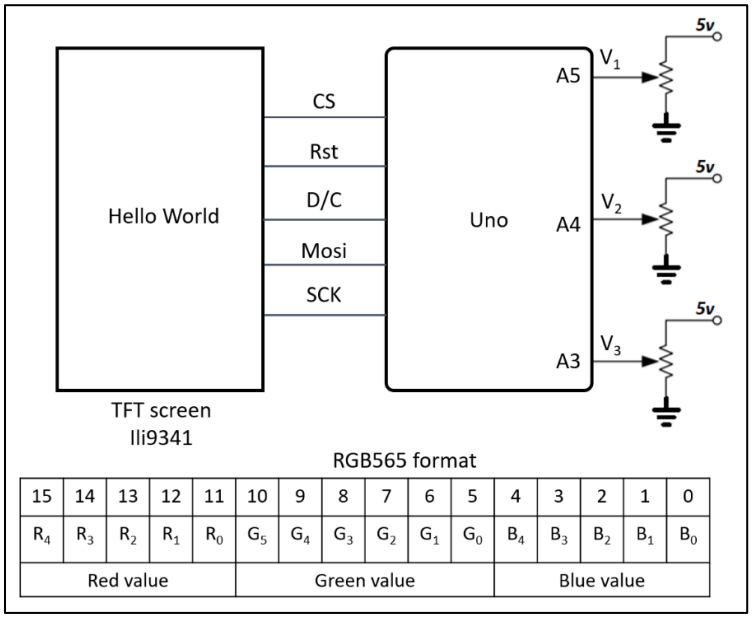
For each of the following 11 multiple choice questions (MCQs), select ONLY the ONE correct answer.

Mark your choice on the answer bubble sheet. ..... [The 11 MCQs are equal in weight]

Q1—Q11: Arduino Uno microcontroller is used to write on a Illi9341 TFT screen. Three potentiometers are used to adjust the font color though three voltage V1, V2, and V3 that connected to A5, A4 and A3 respectively. The color format on Illi9341 TFT is RGB 565 as shown in the Figure. The Uno microcontroller runs PROG1 to perform the described operation.

Notes:

1) V_R for ADC= 5 Volts
2) Text terminal is connected on serial lines for debugging



RGB565 format

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
R_4	R_3	R_2	R_1	R_0	G_5	G_4	G_3	G_2	G_1	G_0	B_4	B_3	B_2	B_1	B_0
Red value					Green value						Blue value				

1. In PROG1 line 1, the statement <EXPR1> should be

A) #include <stdio.h>	B) #include <Wire.h>	C) #include <SPI.h>	D) #include <stdlib.h>

2. In PROG1 lines 6-7, the values of <V1>, <V2>, and <V3> respectively should be

A) 0, 1, 2	B) 5, 4, 3	C)A0, A1, A2	D) A5, A4, A3

3. In PROG1 line 10, the value of <V4> should be

A) 12	B) 11	C)13	D) 15

4. In PROG1 line 11, the value of <V5> should be

A) 12	B) 11	C)13	D) 15

5. In PROG1 line 12, the value of <V6> should be

A) 12	B) 11	C)13	D) 15

6. In PROG1 lines 19-21, the statement <FUNC> should be

A) digitalRead	B) analogWrite	C) analogRead	D) digitalWrite

7. In PROG1 line 22, the statement <EXPE2> should be

A) (B>>5)<<11	B) (B>>5)	C) (B>>4)	D) (B>>4)<<5

8. In PROG1 line 23, the statement <EXPR3> should be

A) (G>>5)<<11	B) (G>>5)<<4	C) (G>>4)<<5	D) (G>>5)

9. In PROG1 line 24, the statement <EXPR4> should be

A) (R>>5)<<11	B) (R>>5)	C) (R>>4)<<5	D) (R>>5)<<4

10. In PROG1 line 25, the statement <EXPR5> should be

A) R+G*2+B	B) R/11.0+G/5.0+B	C) R*11+G*5+B	D) R+G+B

11. In PROG1 line 28, if V3=4.0 Volts the output on the debug terminal should be (nearest value)

A) B = 25	B)) B=818	C) B=0.8	D) B=0

PROG1 Q1-Q10

```
1  <EXPR1>
2  #include <Adafruit_GFX.h>
3  #include <Adafruit_ILI9341.h>
4  #define R_PIN <V1>
5  #define G_PIN <V2>
6  #define B_PIN <V3>
7  #define TFT_CS   8
8  #define TFT_RST  9
9  #define TFT_DC   10
10 #define TFT_MISO <V4>
11 #define TFT_MOSI <V5>
12 #define TFT_CLK  <V6>
13 Adafruit_ILI9341 tft = Adafruit_ILI9341(TFT_CS, TFT_DC,TFT_MOSI,TFT_CLK,TFT_RST,TFT_MISO);
14 void setup() {
15    Serial.begin(9600);
16    tft.begin();      //initialize the TFT screen
17 }
18 void loop(void) {
19     unsigned int R= <FUNC>(R_PIN);
20     unsigned int G= <FUNC>(G_PIN);
21     unsigned int B= <FUNC>(B_PIN);
22     B=<EXPR2>;
23     G=<EXPR3>;
24     R=<EXPR4>;
25     unsigned long color= <EXPR5>;
26     Serial.print("R= ");            Serial.println(R,DEC);
27     Serial.print("G= ");            Serial.println(G,DEC);
28     Serial.print("B= ");            Serial.println(B,DEC);
29     Serial.print("color= ");        Serial.println(color,DEC);
30     tft.setCursor(10, 250);         // Text location on the screen (x,y)
31     tft.setTextColor(color);        // Font color
32     tft.setTextSize(3);             // Font Size
33     tft.println("Hello World");
34 }
```

Model Answer:

1	2	3	4	5	6	7	8	9	10	11
C	B	A	B	C	C	B	C	A	D	A

END of Exam

Examination Committee
Dr. Mohamed A. Sobh,
Dr. Ahmed M. Zaki.

Exam Date: 13st of June, 2022