بسم الله الرحمن الرحيم

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جامعة
النجاح الوطنية
كلية الهندسة وتكنولوجيا
المعلومات
قسم هندسة الحاسوب

Course Name: Digital Electronic Circuits

Course ID: 10636332

Topic: Final assignment

Date: 15th/12/2022

General rules:

- **You can work in teams of two:**
  - **You can choose to work individually without a group.**
  - **If you are working in a group, then use any student ID from the group.**
  - **Each team member to submit his/her circuit/report/video/… to Moodle, the submission should be identical for both team members.**
- **No report is needed for this assignment: discussion is expected.**
- **The duration of this assignment is 10 days (25th/Dec/2021)**
- **2.5% penalty for each delay day: maximum of 7 days late.**

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Option 1: Hardware based

- **You are required to build an alarm system which detects high levels of specific input from one of the following sensors:**

0) Temperature	**1) Gas/fire**	**2) Light**
3) Infrared sender/receiver	**4) Ultrasound**	**5) Pressure/Touch**
6) Humidity	**7) Water Level Sensor**	**8) Flex Sensor or Touch Sensor**
9) Sound Sensor or Movement (PIR) Sensor		

- **The last digit of your student ID will specify which sensor you work with.**
- **Convert the analog output of the sensor to a digital signal (if it is not automatically converted by an available module/output): H=alarm, L=no problem**
- **Connect the digital output to a 555 timer to generate a signal of 600Hz frequency which is then connected to a buzzer/speaker.**
- **Submission:**
  - **1-minute video demonstration of your working circuit, and explanation of how the circuit works (maximum 1 minute)**
    - **Or a small report explaining your work instead of the video.**
  - **Block/circuit diagram of your circuit using your favourite drawing tool: pen and paper, power point, CAD tool (tinkercad, KiCad, Proteus, …etc)**

Option 2: LTSPICE simulator based

- **You are required to demonstate a 10 bit voltage switched DAC discussed in lectures using LTSPICE.**
- **Assume digital voltage levels are 0V for LOW and 5V for HIGH.**
- **In the voltage switched R-2R DAC, use R to be the last three digits of your student ID + 1000. For example, if your student ID is 1189876543, then R value used will be 543+1000=1543 ohm.**
- **Demonstrate your DAC circuit using a counter input from 0 – 1023 with increments every 1 microsecond.**
- **The final analog output voltage range should be between 0 and +5 Volts, hence you would need an inverting amplifier in the final stage of your circuit.**
- **You are free to choose any operational amplifier available in LTSPICE**
- **<u>Submission:</u>**
    - **1-minute video demonstration of your working circuit, and explanation of how the circuit works (maximum 1 minute)**
        - **Or a small report explaining your work instead of the video.**
    - **You must submit the LTSPICE circuit files**