Part 1: Firefighting robot

- Assume that:
  - We have a fire fighting robot.
  - It keeps moving until **power off switch** is used to turn it off. It uses **three "Ultrasonic Ranging Module HC - SR04"**to check front, right and left paths. If it detects any obstacles in front, it checks right if it is clear, it turns right. Otherwise, it turns left. Add **voltage source for each ultrasonic sensor** to simulate the distance. It uses **two stepper motors** to move forward, turn right or left. If both motors ON, it keeps moving forward. Stopping one motor and moving the other motor one full rotation, making the robot rotate with 45^{o} degrees to the rotated stepper motor direction.
    [Hint, you can check the ultrasonic and stepper motor examples attached with *SimulIDE*]
  - The robot searches for fire. It uses Digital fire detector sensor (Replaced with a **switch**). If the sensor detects fire, it sends HIGH for half a second then returns back to LOW. If it is HIGH for less than half a second then it is not fire and the fighting system should not work. It is just sensor hazard.
  - This robot has a fire fighting fan to vanquish fire (appears as a **stepper motor)**. If the robot detects fire it must stop moving and the fan motor should keep rotating until receiving HIGH signal – with any interval - from the Digital fire detector sensor (the switch).
  - The robot has a blinking **led** that blinks every one second.

Note: required components are

- 1 LED: Keep blinking
- 2 switches: power off switch **-** Digital fire detector sensor
- 3 stepper motors: two stepper motors for moving and one as the fan motor
- 3 Ultrasonic modules: front, right and left
- 3 voltage sources: one for each ultrasonic module
- Any number of resistors, if you need.

This task is graded out of 10 based on the following points (one mark for each point)

1. detect obstacles even it appears suddenly
2. make a correct rotation with no delay
3. detect fire successfully even it appears suddenly
4. start firefighting (Fan) correctly
5. stop firefighting (Fan) correctly
6. avoid false fire detecting (HIGH for less than half a second)
7. LED keeps blinking without any change of timing
8. You shouldn't use delay
9. You should use one interrupt
10. No more than 10 lines more than the best fully working optimized code

You must submit your task as a one compressed file (.zip or .rar only- No other extensions are accepted)

- This compressed file must contain ONLY two files named as
  - Task2.ino
  - Task2.simu
  - If you want to add any comments about your solution, add it as a comment at the begin of Task2.ino file (without putting any personal information)
- The compressed file name MUST be YourCode_YourName_Task2_V1.zip or YourCode_YourName_Task2_V1.rar
- YourCode starts with "9" for the two semester students and with "1","2","3" or "4" for credit hours students (You login to the faculty site using this code)
- Don't write your name or your code inside any of the two files, your code and name should appear only at the compressed file name.
- If you need to re-submit your work, change V1 in the compressed file name to be V2, V3 … etc. For example, if you are resubmitting for the third time, your compressed file name must be YourCode_YourName_Task2_V3.zip or YourCode_YourName_Task2_V3.rar

Penalties:

-20 : for Cheating [Copied designs or codes]

-2 : delivered file in extension other than .rar or .zip

-1 : Compressed file name in the format YourCode-YourName-Task2 instead of YourCode_YourName_Task2

-2 : incorrect code in the compressed file name
-2 : more than two files in the compressed file
-1 : compressed file name without versioning (V1,V2 .. etc.)
-1 : files inside the compressed file with names other than “Task2.ino” or “Task2.simu”
-1 / hour : for the delayed submission after the deadline

Part 2: Task 1 Review (If you didn’t deliver task 1, discard this part. Its mark is part of task 1 grade, not this task)
It is required to review each other solutions of task 1 to check how others think about this task.
Steps:
Open this excel sheet
https://docs.google.com/spreadsheets/d/1yWj6AcaHM4XIFlwW8ZrAAFYPOIKu8ACcyzx2seijnPw/edit?usp=sharing
you will find three tasks solutions in front of your name. Download these zip file. Each file contains design and code. Run each design with its code then open this link
https://forms.gle/qx3KgbNvs8fdD7239
and answer its questions
Note: Ensure that your code is written correctly in the spread sheet file