**Year 9 Electronics Challenge – 2022**

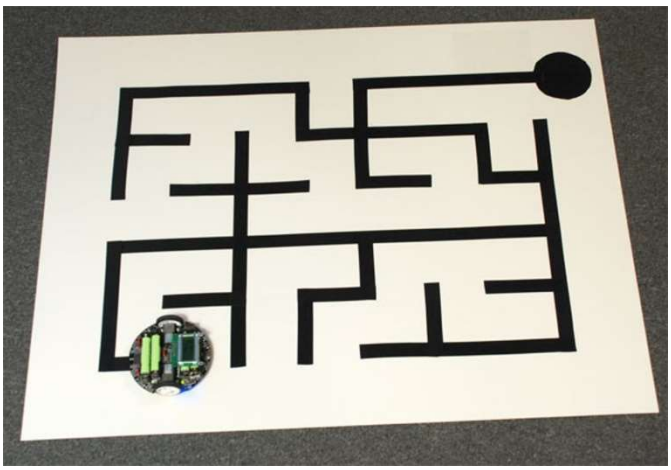
**How will it work?**

The competition itself is aimed to encourage teams of 2-3 to independently develop and test a robot. So far you have learnt the basics of the hardware you will be working with, and you are now ready to enter the more independent phase of the competition. But what are we looking for from the teams?

To provide a conclusive winner, we have developed a scoring system based on a number of factors surrounding your buggy:

- Maze solve speed (max 20 points)
- Solution design (max 10 points)
- Build quality (max 10 points)
- Engagement/Commitment (penalty of up to -5 points)

Each of these will be detailed in full below.



**Maze Solve Speed**

As you are aware, the main aim of the competition is to design a robot capable of solving a maze, which will be held early in the summer term. This maze will be created from black tape and **must be solved autonomously** by the buggy with not human interaction during the solve attempt. In order to achieve this, this phase of the competition will be divided into 2 main stages:

<u>Stage 1</u>

Each robot is allocated a 5 minute period (immediately prior to the maze solve attempt), within which the buggy is given a chance to navigate around the maze (using an algorithm of your choice). The program must then store the layout of the maze locally, which will then be used in the following stage.

The maze itself will have false turns and multiple routes to the end. Teams are encouraged to make the most of this first stage to gather as much data as possible (ideally finding all routes), to give them the best chance of finding the shortest, and most efficient path to the end.

<u>Stage 2</u>

After gathering data, your buggy will be placed back at the start line. The robot must then follow the "fastest" route that your algorithm has calculated in order to reach the finish line. The time taken will then be compared with other teams to deduce the winner, and points will be allocated accordingly.

<u>Detailed Information</u>

- The start and finish line will both be formed of 2 solid strips of tape, parallel to each other, to be detected by the right and left IR sensors. This should return a value of 0, 1, 0 from the IR sensors (0 for black tape).

- During stage 1, teams are able to make alterations to the robot and its software, **as long as this does not involve any form of hard-coding the design of the maze**.
- Any remote control or physical interaction with the robot during its solve attempt is prohibited.
- This section awards a maximum of 20 points.

**Solution Design**

This section is based on the software implemented within the robot. It has several key aspects:

- Choice of algorithm (Both when mapping out the maze and in finding the fastest route)
- Readability (good variable names, commenting, etc.)
- Code structure (decomposition, logical ordering)

Good readability will not only assist in this stage, but it will make your code easier to work on as a team, and improve the implementation of your choice of algorithm.

This section is worth a maximum of 10 points.

**Build Quality**

The build quality of a team's robot is primarily based on how reliable the design is, and how the components are arranged for better functionality, speed and aesthetics.

Whilst it is not compulsory to design your own base, it is highly recommended to do so. This will distinguish you from other teams and will give a clearer picture of the reasoning your team took when deciding how to arrange the components on the buggy. It is also important to remember that this will develop your skill in CAD and laser cutting (or other methods you choose to use).

This section is worth a maximum of 10 points.

**Engagement**

This section concerns your engagement during the course of the competition. This includes attendance to the *few* compulsory Thursday sessions, looking after the hardware (not damaging/losing the kit) and evidence of good research into possible algorithms for your maze solver.

It is important to note that this is a penalty which teams will receive for neglecting the hardware and the spirit of the competition, rather than increasing your overall score.

This section is a penalty of at most -5 points from your overall score.