



2018

# Technical Skills Assessment Test



# Instructions

1. Think smart. Be smart. Get smart
2. Where Code is required it must be written considering work environment of code is in Arduino or Atmel Studio IDE.
3. Atmel 328p will be the controller where the code is meant to execute.
4. Document all your progress. We prefer *technical documentation* approach. Document the code used. Also explain your approach throughout process to achieve require goals in detail. *We don't have any stringent guideline for documentation. Just make sure you are able to showcase your work in understandable manner.*
5. It is preferred that code is as optimized as possible.
6. Don't forget the stupid semicolon where required.
7. Well, enjoy the task there is no fun without it...he.he.
8. Best wishes. Do well.

# Assessment Task

## 1.BLACK AND WHITE

Manoj was working on an AGV. AGV was manufactured to move on Barcode like strips which were made on the floor. AGV consist of an color sensor which return 1 while on white color and 0 while on black .Help Manoj with a code/algorithm to find number of black and white line on floor as the AGV maneuver over the floor?





## 2. TRICKY MATRIX OPERATION

Lets explain this question with small data sample. Assume a uint16\_t datatype was used to store data of 4x4 matrix display.

Input data :0x124F

“0001 0010 0100 1111” Represents “7” in 4x4 matrix display form

```
1 1 1 1
0 0 1 0
0 1 0 0
1 0 0 0
```

Functions are needed which manipulate input data to returns a uint16\_t data which has property of representing Mirror and Rotation of it when represented in 2d fashion as shown below.

Output:

0X842F

Mirror

“1000 0100 0010 1111”

Output Data Represents: -

```
1 1 1 1
0 1 0 0
0 0 1 0
0 0 0 1
```

Mirror

0X9531

Rotate counter clockwise

“1001 0101 0011 0001”

```
1 0 0 0
1 1 0 0
1 0 1 0
1 0 0 1
```

Rotate

Your task is to do the same with uint\_64 datatypes which represents 8x8 matrix data.

Input: 0XFE010101010101FE

Output:

0X7F80808080807F

0X7E818181818181

Mirror

Rotate

Input: 0X01020408102040FF

Output:

0X80402010080402FF

0X8141211109050301

Mirror

Rotate

Input: 0X4008021080200401

Output:

0X0210400801042080

0X0120024010048008

Mirror

Rotate

Note: -The scripts are meant to run in AVR 8-bit controller hence code accordingly.

### **Bonus task**

Do you have any experience in interfacing sensors, actuators,... and integrating them in any system?

If yes, then state which all and document your working related to it in detail.