Bangladesh University of Engineering and Technology

Course No.: EEE 304

Course Title: Digital Electronics Laboratory

Project

Online Exam Evaluation Assistance

Submitted by:

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Department: EEE

Section: B

Level: 3 **Term:** 2

Group: K

Teammates: 1. Sarwar Jahan Saikat -1606089

2. Mahamudul Hasan -1606094

Drive Link:

https://drive.google.com/drive/folders/1Yx7rnm2KMn4Wa6LWnv4aK9wW9nBmMMJ?usp=sharing

Introduction:

A digital transformation is happening all around the world. Our education system is also evolving with it. To keep pace with this digital transformation, Smart classrooms, Virtual attendance, Video conferencing classroom, hi-tech labs etc. were introduced to education system. Schools, Colleges, Universities are gradually shifting from traditional paper-based evaluations to online evaluation systems. Our goal is to develop a system to make this online exam evaluation more efficient.

Problem Statement:

If a classroom has 60 students and 20 questions to answer in a online exam, it is more likely that the students may use unfair means in exam. To make this system more robust, we distributed the questions so that we get minimum overlapping of questions at a certain timeslot among the students. In other words , at a certain time a particular question will be answered by minimum number of students . So, it will be more efficient than the regular way. In this project we divided the whole time into some slots and distributed the questions into the slots. Due to Covid-19 pandemic, every institution is trying to adopt the online based exam system. But If the questions are not shuffled, it becomes easier for the students to copy and answer the same question. In this system it will be tough for a student to find another student who answers the same questions.

Working Procedure:

In real life scenario, number of questions will not be more than the class size.

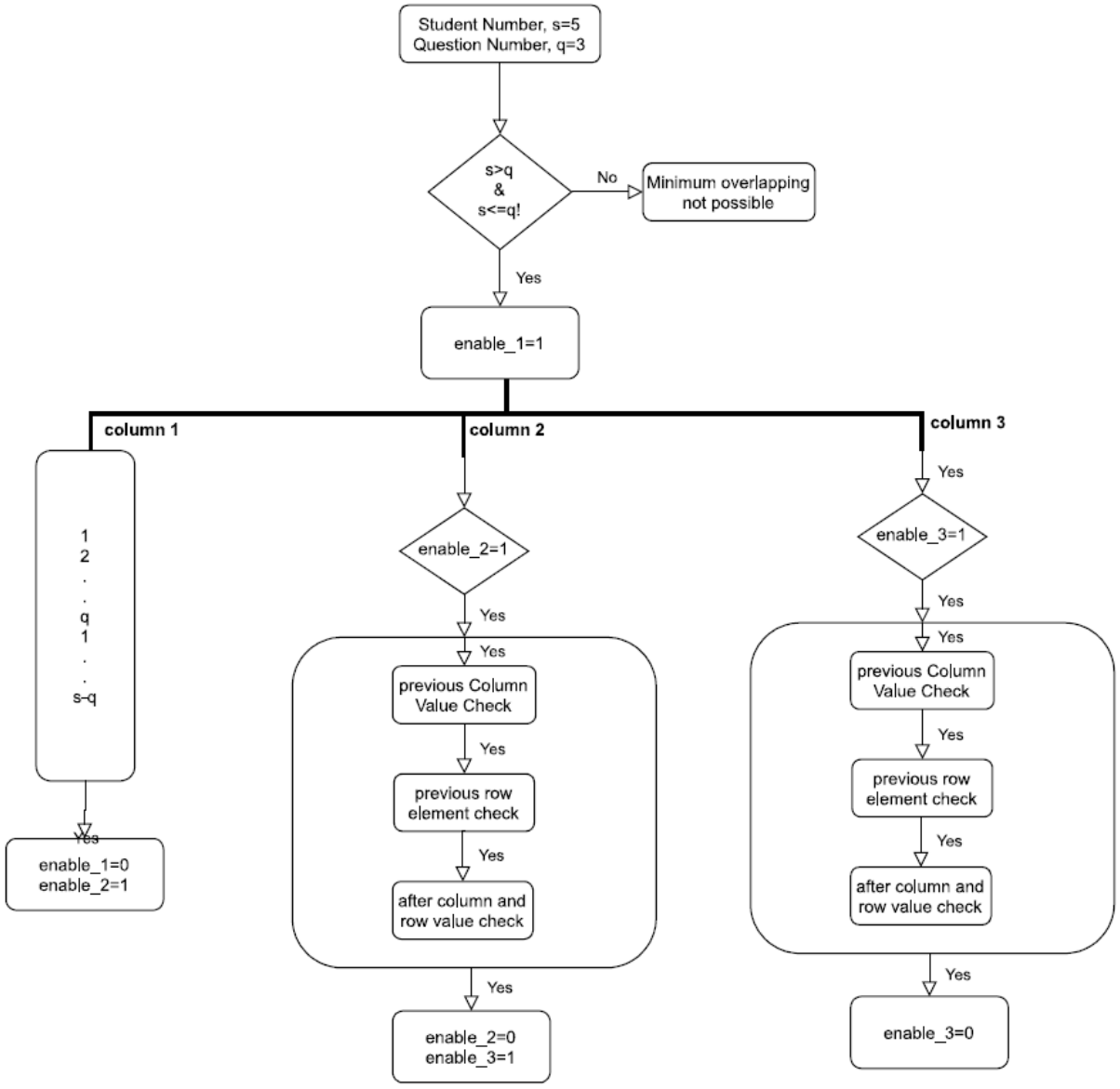
We developed this system for 5 students with 3 questions for simplicity and convenient implementation purpose.

So, each student has to answer 3 questions. Our goal is to ensure a minimum overlapping of a question in a certain time.

If we imagine a matrix with size of (question*student), then this matrix will have “q” number of rows and “s” number of columns. Each column will represent the sequence in which a student will answer the questions and each row will represent the questions students have to answer in a certain time slot.

Now we have to distribute the questions among the students in different time slots according to our algorithm.

Flow Chart



Here, we imagined the matrix as (student*question),which is transpose of previous matrix(question*student)

We developed the system for 5 students with 3 questions.When we want to put a value in the matrix at first we need to check the previous row and column values.From here we will get the avialable value to put .Then we need to check how many times the values are occurred in the existing column or previous rows.We will choose the value which occurred less in the existing column.If we get two values which equally occurred ,then the first one will get priority.

For first time slot:

So at first column we put these values serially for student 1,2,3.For student 4,5 we will check with our algorithm.

For checking 4^{th} element in column 1. At first we should check the available values.

Available values are:1,2,3

1 occurred: 1 time

2 occurred: 1 time

3 occurred:1 times

Each value has occurred for same number of times. So, the first one will get the priority. So, the 4th element will be 1.

After putting 1 here if we check for last element of column 1:

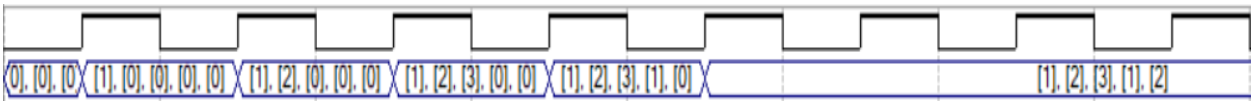
1 occurred:2 times

2 occurred:1 time

3 occurred:1 time

As 1 is already occurred for 2 times we won't choose this anymore. We will choose 2 here. So our first column will be like:

From Waveform in Quartus:



To make second column we need to check the values of previous column in same row. The first element of second column belongs to row 1.So at first we need to check the previous values of the same row:

In first row, first element is 1.

So, the available values are:2,3

Occurrence of 2 in the existing column=0

Occurrence of 3 in the existing column=0

So, it will take the value 2

From Waveform:

Now we will go for the next value of this column. This belongs to row 2.

Previous values of row 2 is 2.

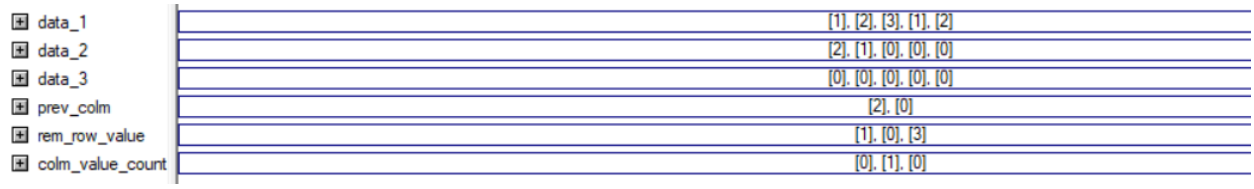
Available values: 1,3

Occurrence of 1 in the existing column=0

Occurrence of 3 in the existing column=0

So, it will take the value 1

From Waveform:



So, first two elements of column 2 is 2,1.

Now we will go for the next value of this column. This belongs to row 3.

Previous value of row 3 is 3.

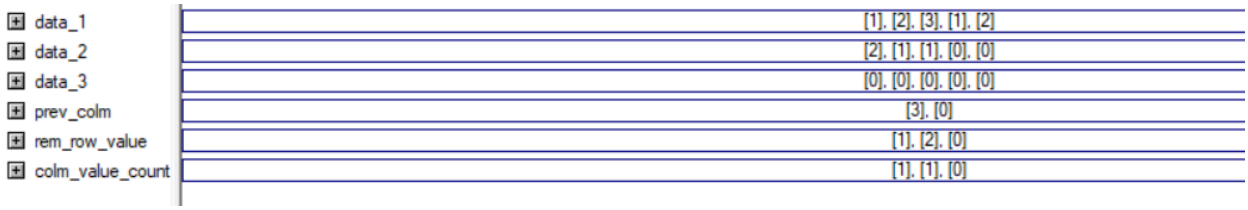
Available values:1,2

Occurrence of 1 in the existing column=1

Occurrence of 2 in the existing column=2

So, it will take the value 1.

From Waveform:



So, first 3 elements of this column is 2,1,1.

Now we will go for the next value of this column. This belongs to row 4.

First element of row 4 is 1.

Available values=2,3

Occurrence of 2 in the existing column=1

Occurrence of 3 in the existing column=0

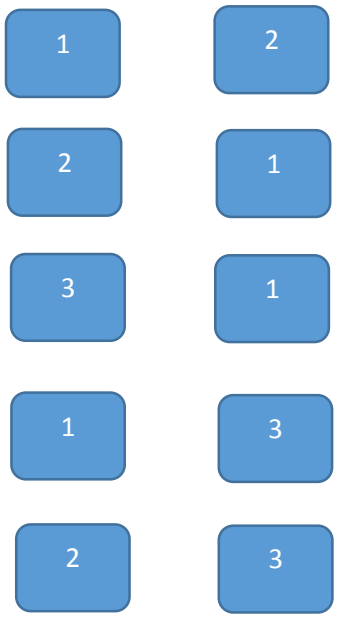
So, it will take 3 as the 4^{th} element of column 2.

From Waveform:

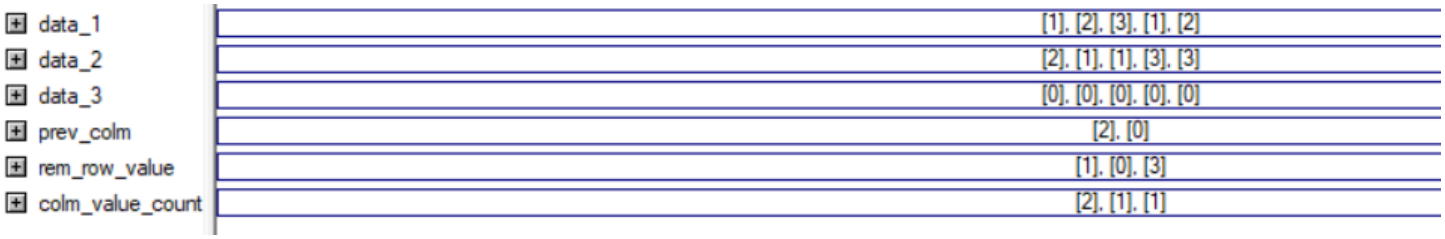
First 4 elements of column 2 is 2,1,1,3.

Similarly, the 5th element of this column will be 3.

So, the 1st and 2nd column will be like this:



From Waveform:

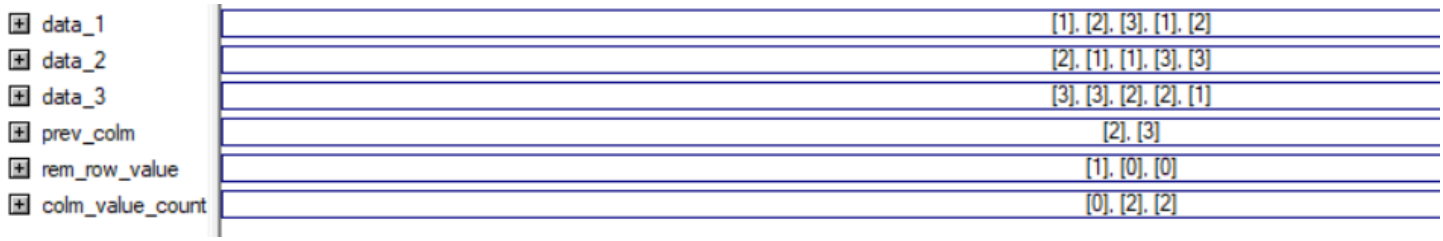


For the last column we just need to check the previous values of existing rows. The rest value will be the 3rd value of this row.

So, the full matrix will be like:

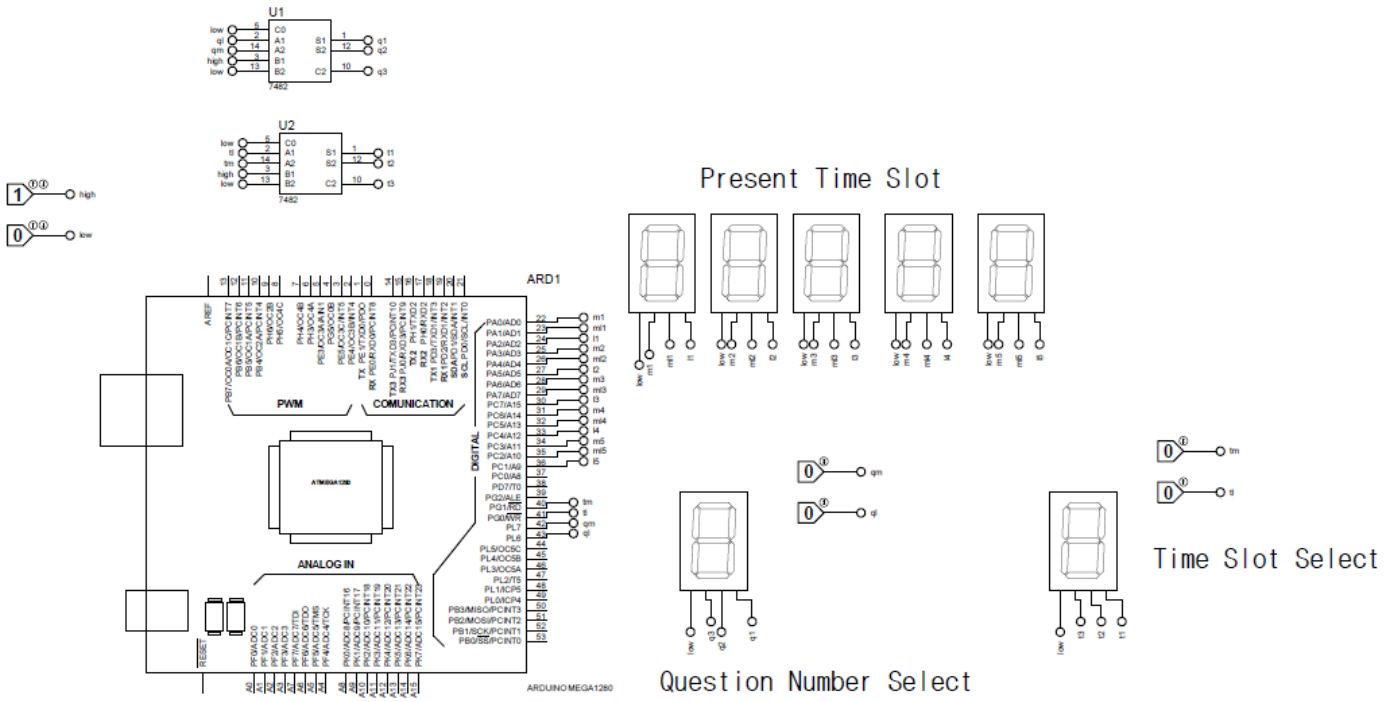
	T1	T2	T3
S1	1	2	3
S2	2	1	3
S3	3	1	2
S4	1	3	2
S5	2	3	1

From Waveform:

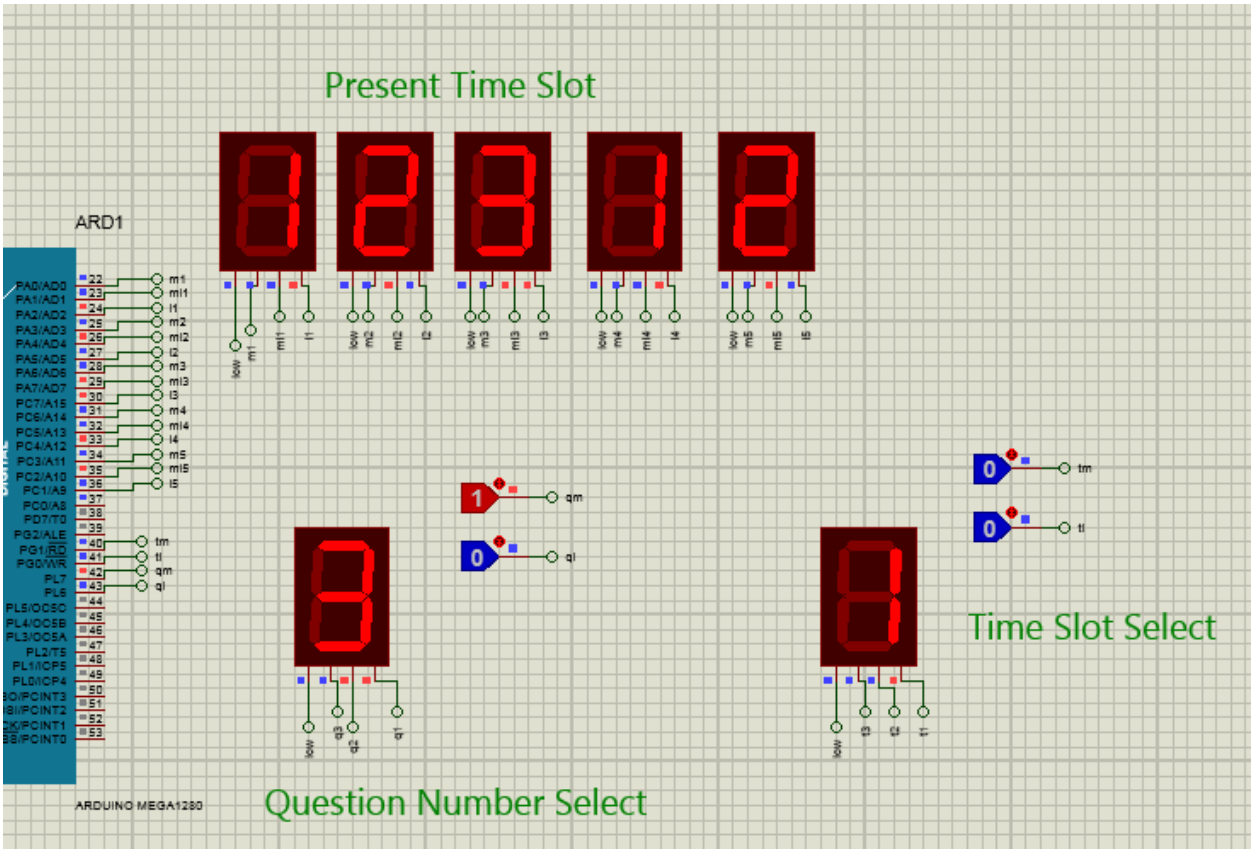


Proteus Implementation:

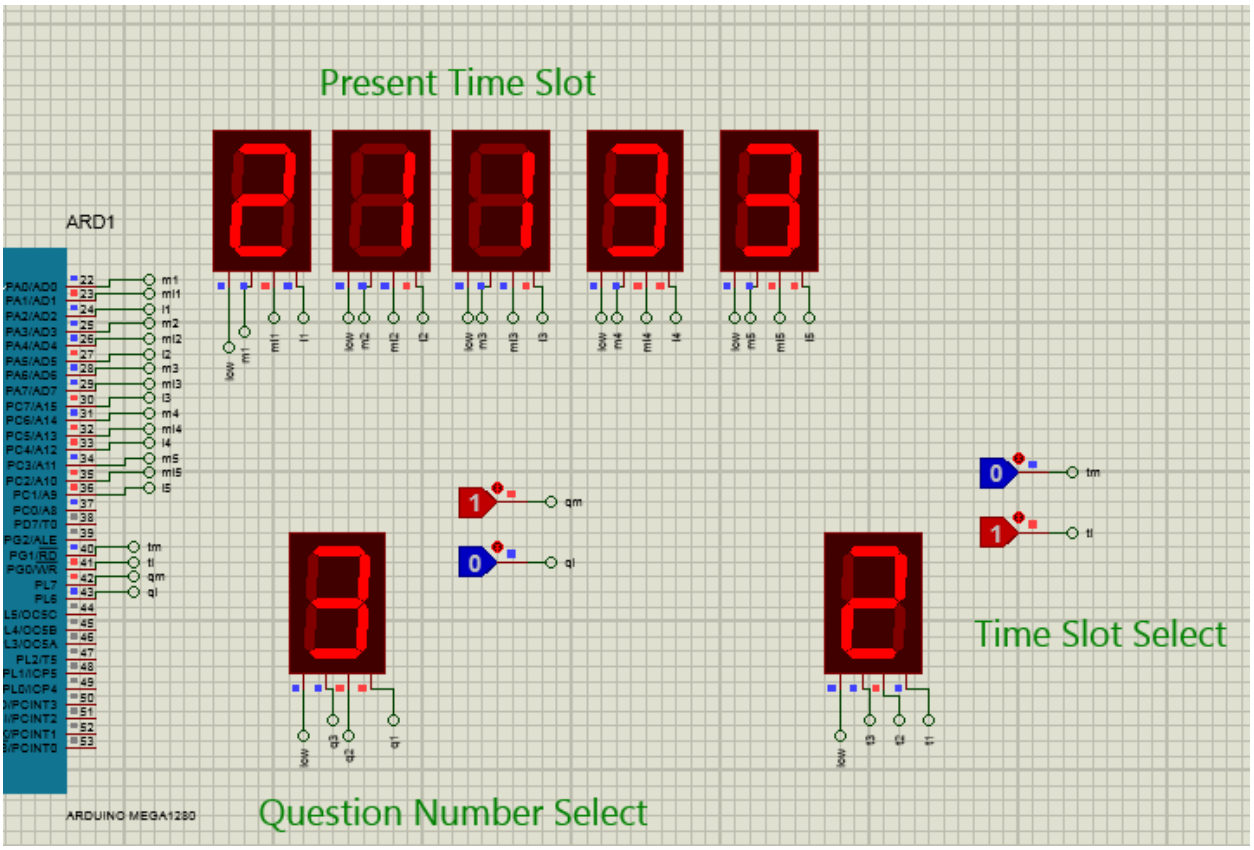
Circuit Diagram:



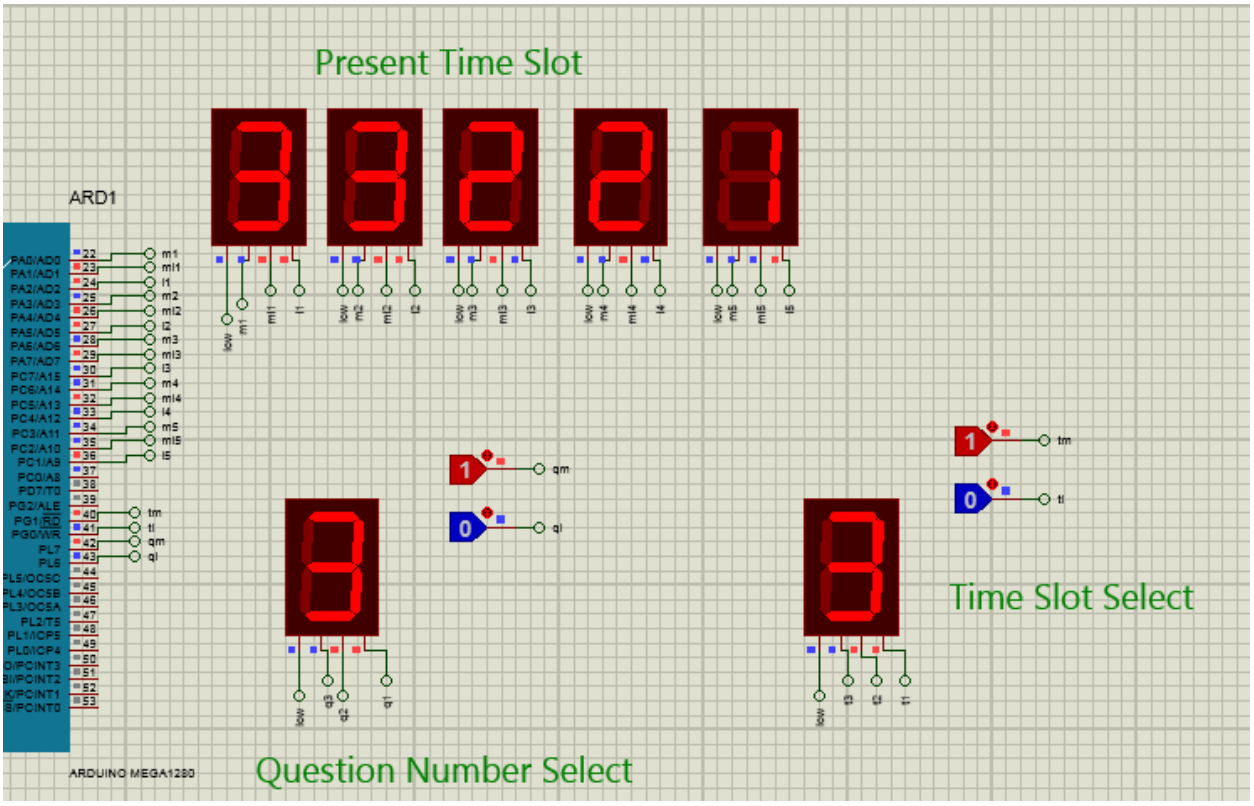
1st Time slot:



2nd time slot:



3rd time slot:



Contributions:

Sarwar Jahan Saikat-1606089:

we divided this project into three parts. Building algorithm, implementing in both proteus and Quartus. I helped my group when we were building algorithm. Then I tried to implement this in Quartus with my groupmate. Every one of my team contributed to build this project.

Mahamudul Hasan-1606094:

We divided this project into three parts. Algorithm planning, implementing in Quartus and implementing in Proteus. I took part in implementing the planned algorithm in Quartus. However, every part of this project was done as a teamwork. Each member of the team has some contribution in each part of the project

Swapnil Saha-1606095:

My contribution in this project was to implement it in proteus simulation. I along with my team members try to simulate the whole project by using simple IC like multiplexers, timer IC etc. But due to the complexity, we had to implement it using Arduino board and we were able to successfully implement it.

Discussion:

The project was unique as it sounds. We did not find any resources available in the internet to smooth the path. So, the algorithm planning and implementation was much harder and time consuming. As, Verilog is not like other programming languages, we could not do some things according to our planned algorithm. Moreover, implementing in proteus was more challenging. Implementing the whole project with digital electronics was extremely tedious. So, to present the project in time, we implemented the project with the help of Arduino in Proteus