

MAKER FAIRE ROME ARDUINO PROJECT CHALLENGE

QUIZBOARD V1

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1. Quizboard – Quick introduction

Quizboard is nothing new to us. It is one of the most easy and fun game to make. We all remember as we started learning how light glows up when connected to cell and how switch affects it. Quizboard came for most of us the first experiment.

It has of two open wire or metal rod which touches different metal plates on board resembling a question and second rod on answers. In case of correct selection a light used to glow up. How fun was that, remember now. User can play by learning and answering right questions.

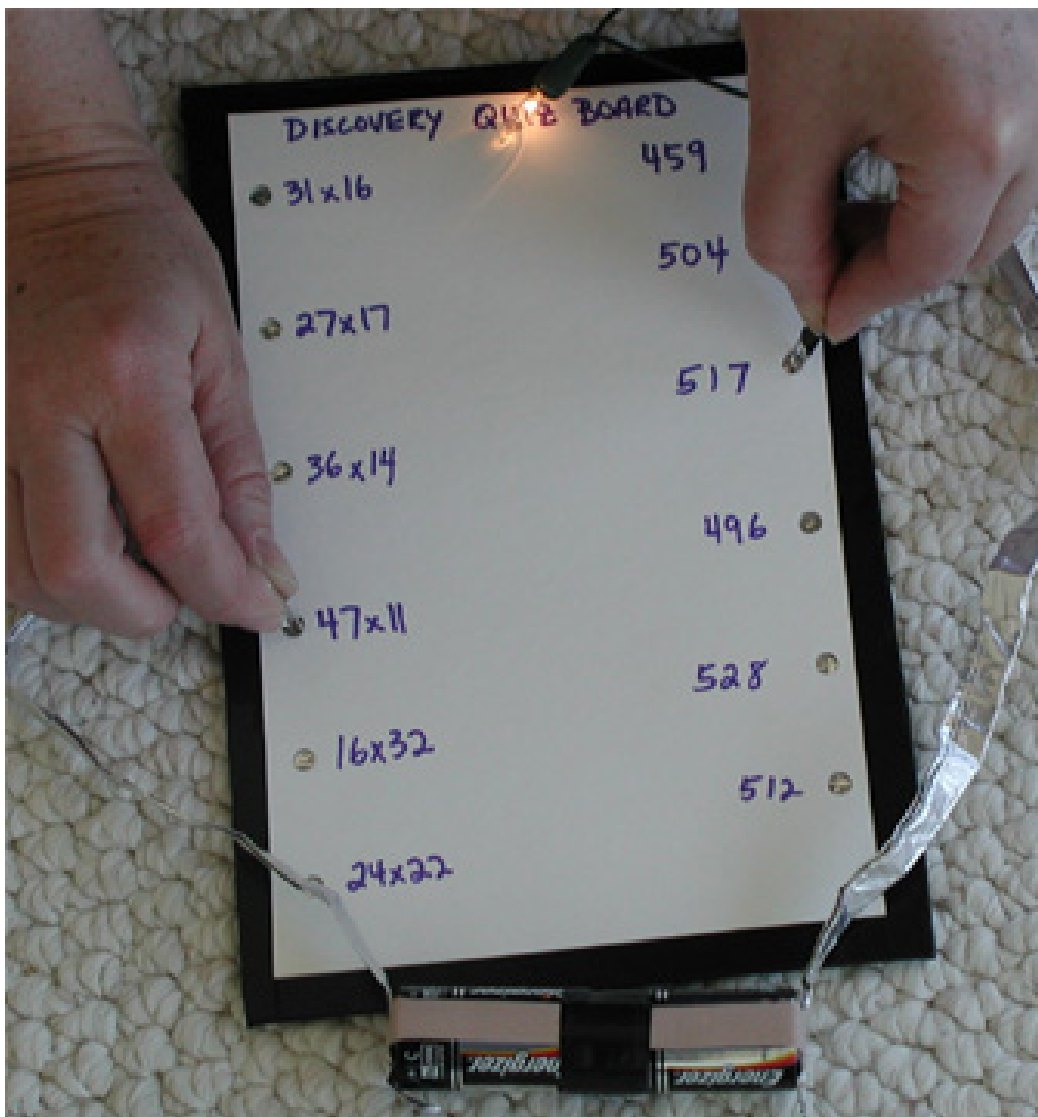


Figure 1: Quizboard¹

¹Image Source: <http://www.darkstar.cc/discovery/electricexam.htm>

2. Motivation for Project

Since my first Quizboard, when I was 8, I have been fascinated by this project but always wondered if it can be made more intelligent, dynamic and better interface? I tried making Quizboards which can glow red in case of wrong and green on correct but was not so impressive.

But lately in Campus Party Berlin 2012, I got my first introduction to Arduino platform. It was awesome. It was workshop on SMS controlled light held by David Cuartielles. I learned how easy things can be made using this platform. And so it happened, I always wanted to remake Quizboard and get best out of it, as a result I present you my version of Quizboard.

I feel great submitting this project to “Maker Faire Rome Arduino Project Challenge”.

*"One should not
always look for new,
improving is fun."*

Sanjeet Raj Pandey

3. Quizboard and Quizboard V1

A quick features between old Quizboard and QuizboardV1.

Features	Quizboard	Quizboard V1
Board Pins.	Metal Pins.	Metal Pins.
Wire to touch.	Used 2 metal Rods or open wire. Sometime switches	Uses capacitive touch, no more hanging wire.
Answer Indication Light.	Had a single light to show right answer.	Uses a LED matrix to show different icons according to right or wrong or timeout in replies.
Sound.	No sound, as far as I know.	Uses Buzzer and an extra audio module to play different mp3 sounds based on answer and connect to external audio system over 3.5mm audio connector.
Ease in extending pins.	Easy as you just need board big enough , two pins and a wire for each extra question.	It uses same pins but can change question printed paper and pass new data over Serial. Sounds complex but its not.
Multiple answers.	No.	Yes.
Multiple question for same answer.	No.	Yes.
Template for Question and answers.	No.	Available a web template that creates Serial data and prints to snap on board.
Data Transfer.	No.	Sends over bluetooth to an android device, can use any bluetooth device with correct application running.
Timeout for selecting answer.	No.	Yes, programmed for 10 seconds but can change dynamically.
Ease of making.	Very easy.	Not so easy.
Source/Schematic available.	Yes, just google.	Yes, from my website.

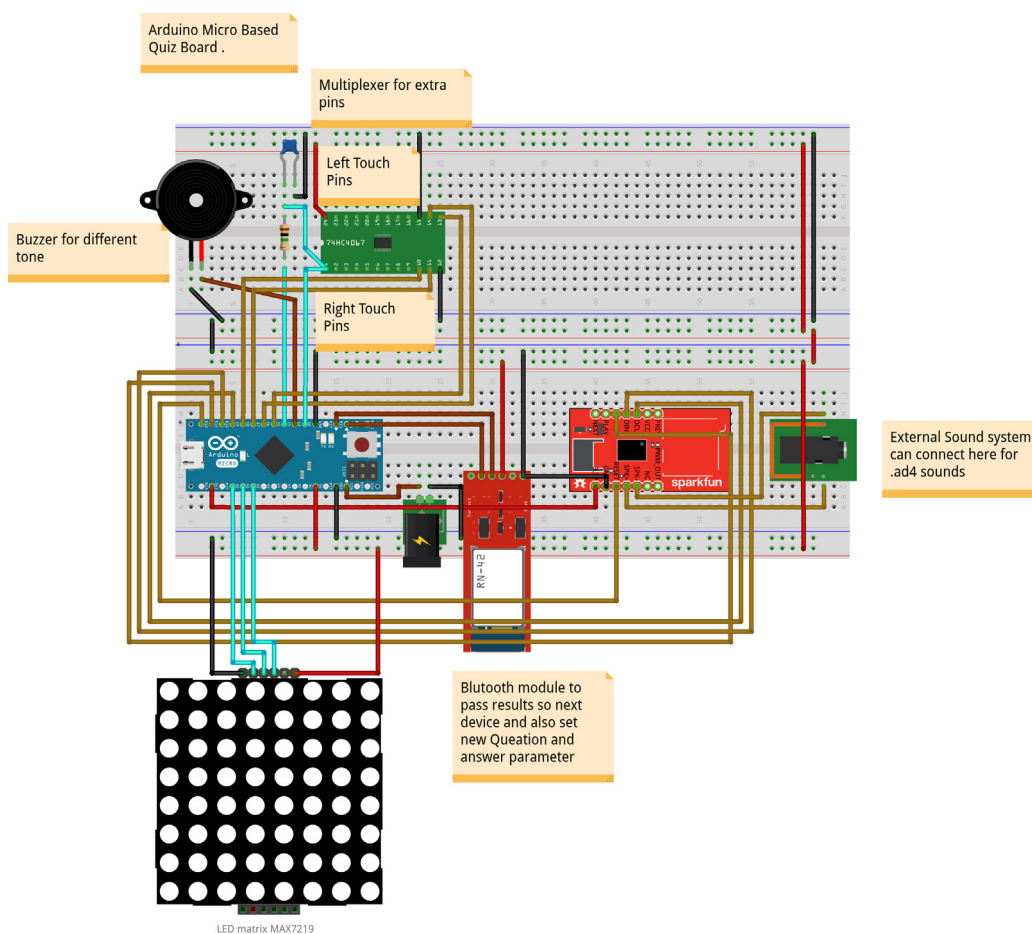
4. Parts used in project

Features	Quizboard V1
Drawing Pins (Open metal)	local store
Thick Board	local store
Connecting Wires	segore.de
Arduino Micro	segore.de
CD74HC4067 analog multi-plexer	tinkersoup.de
Audio Module	tinkersoup.de
Speaker	tinkersoup.de
Bluetooth Module ZS-040	dx.com
Ceramic Capacitor 100pF	conrad.de
1MOhm resistance	tinkersoup.de

Extras:

Soldering kit,
cutter,
basic arduino
development
environment.
Since I have
made it on a
perfboard,
I have fitted all
in a small box.

5. Fritzing Breadboard



fritzing

6. Fritzing Schematic

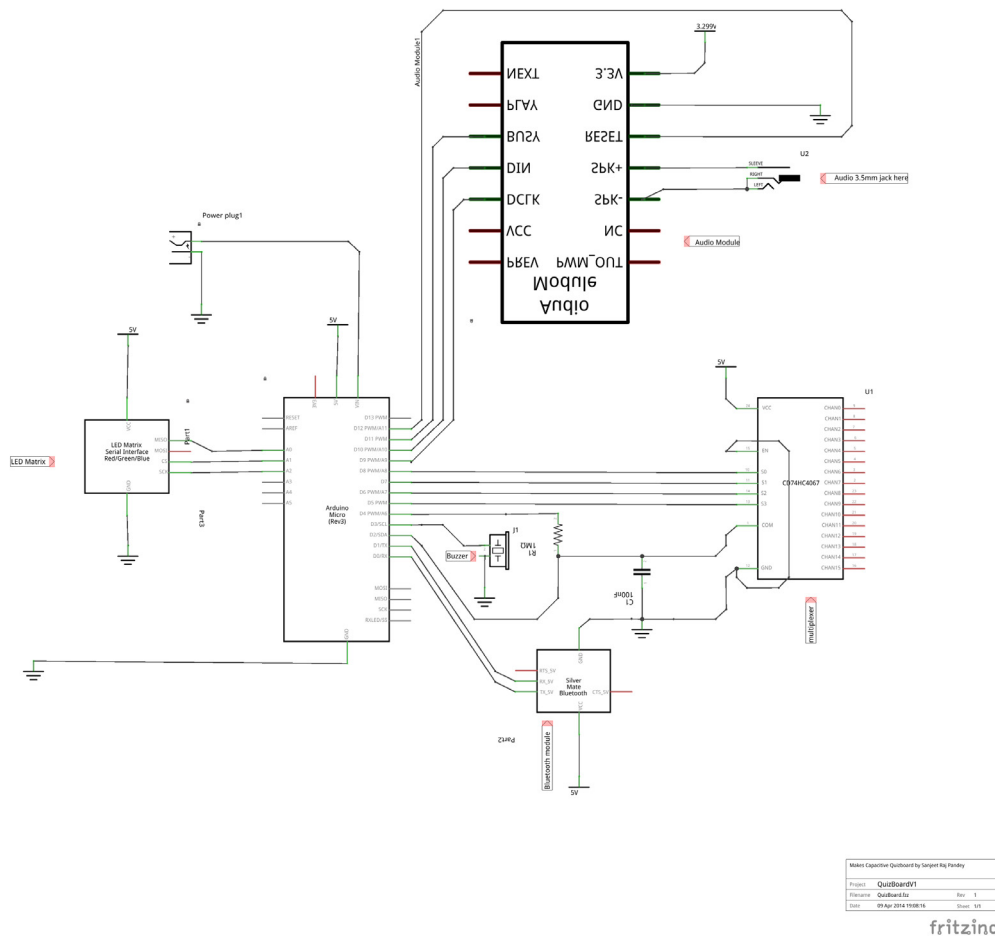


Figure 2: Pins connected should also be set correct in code.
Fritzing file is also available with source.

6.1 Important Points

1. One can use different pins, but make sure you also change them in code
2. For music module all even number 0000,0002,0004 .. corresponds correct answers and odds for wrong.
3. Libraries, snippets used are linked below.
4. I have used Red led matrix. Its a bit different then one in image above.
5. Bluetooth packet is of result-question-answer-duration format , e.g 1-8-7-4, means answer is right, question was pin 8, answered was pin 7 and time to touch answer was 4 seconds. Using long strings over bluetooth was not stable.

6. Images – Making

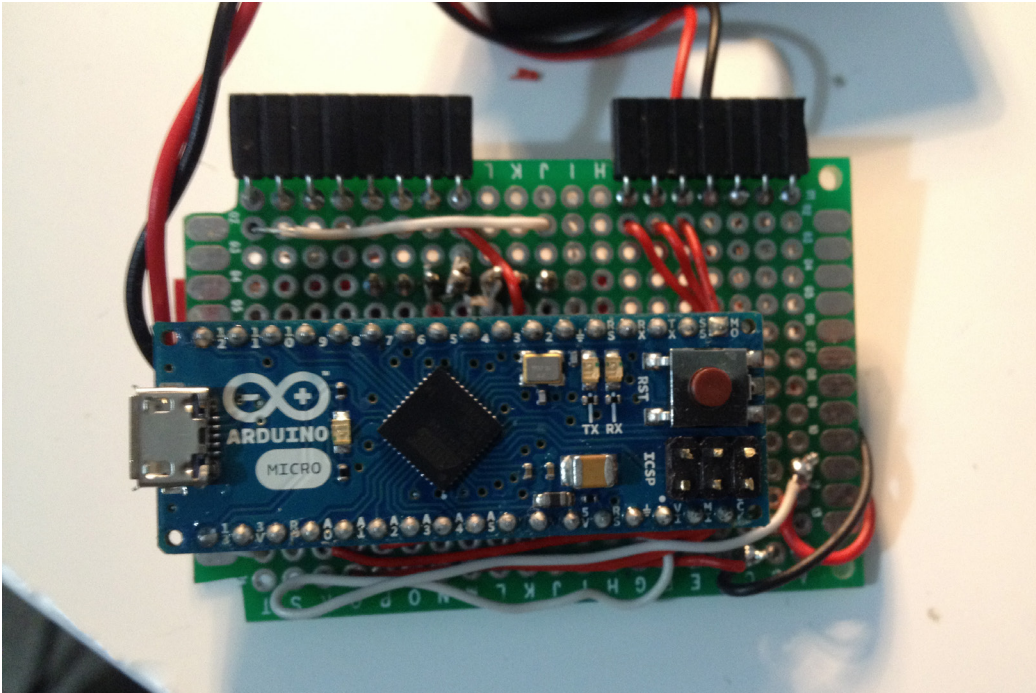


Figure 3: Arduino Micro on PCB

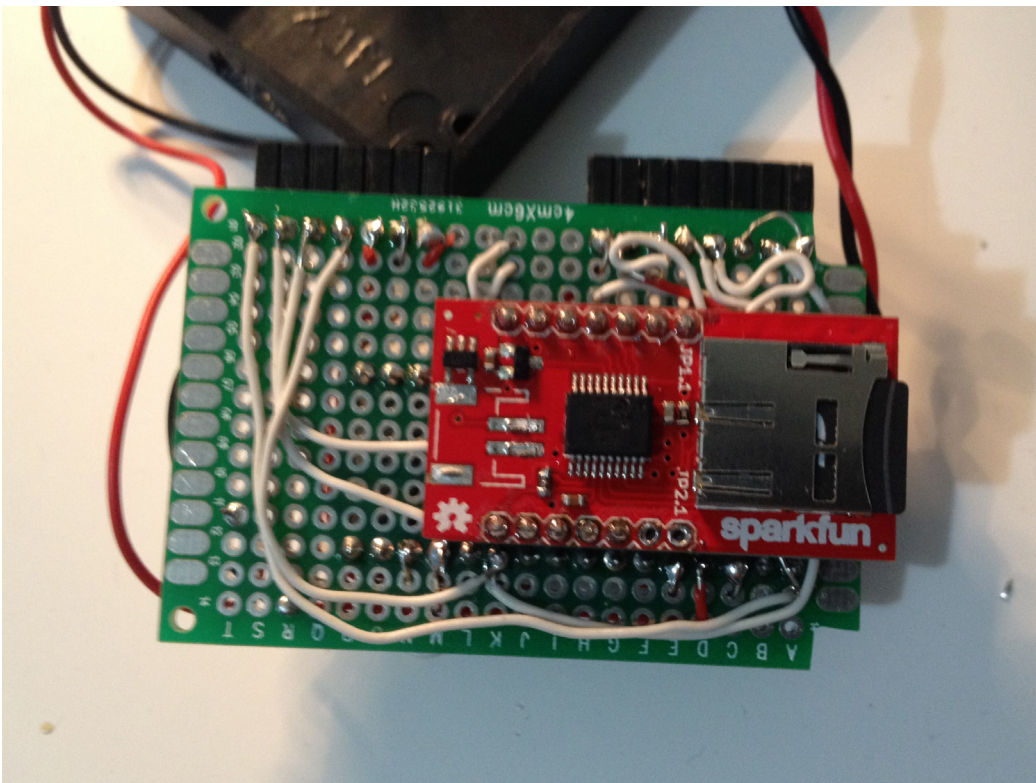


Figure 4: Audio Module PCB

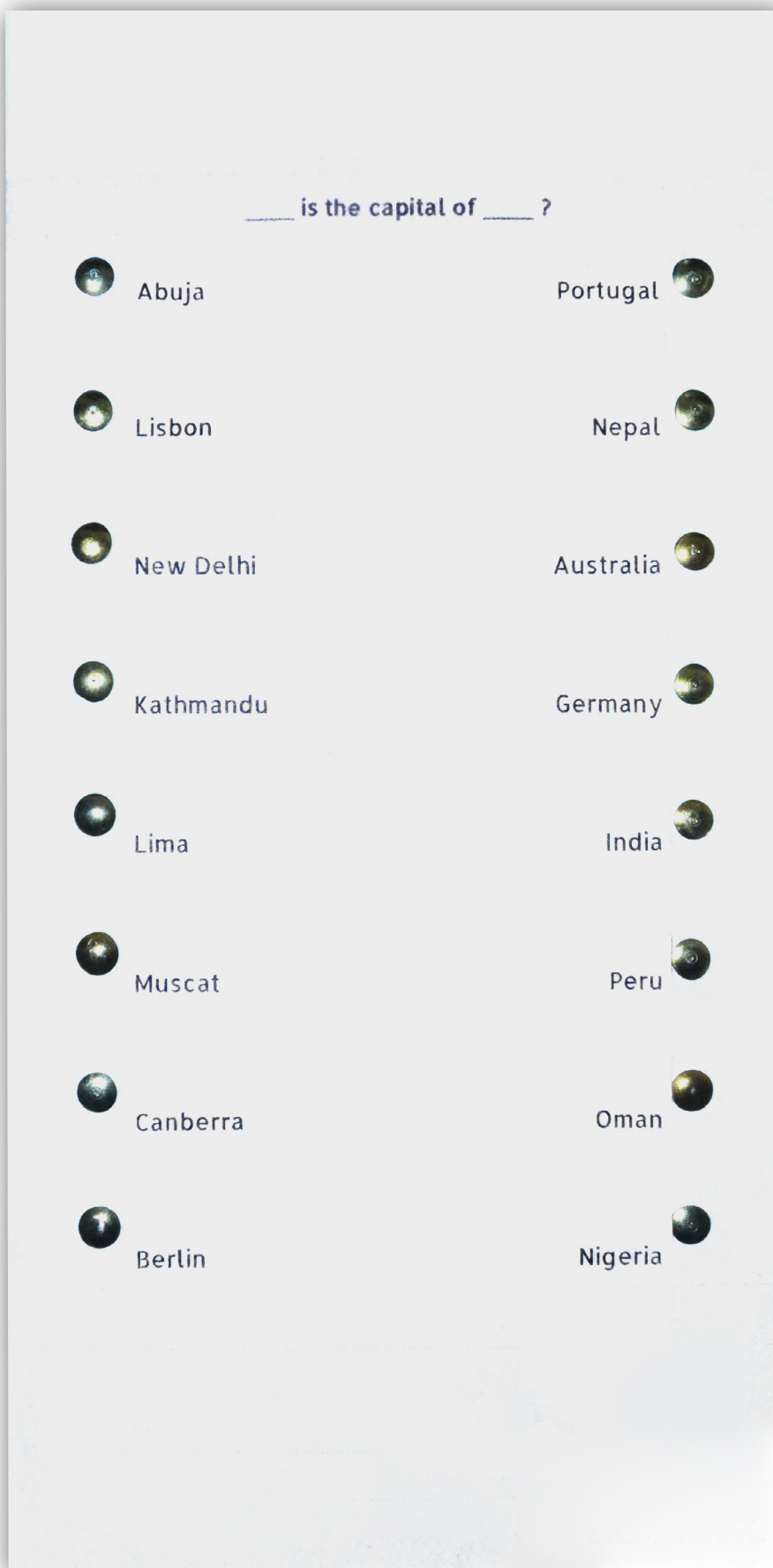


Figure 5: Drawing Pins as capacitive Touch on board

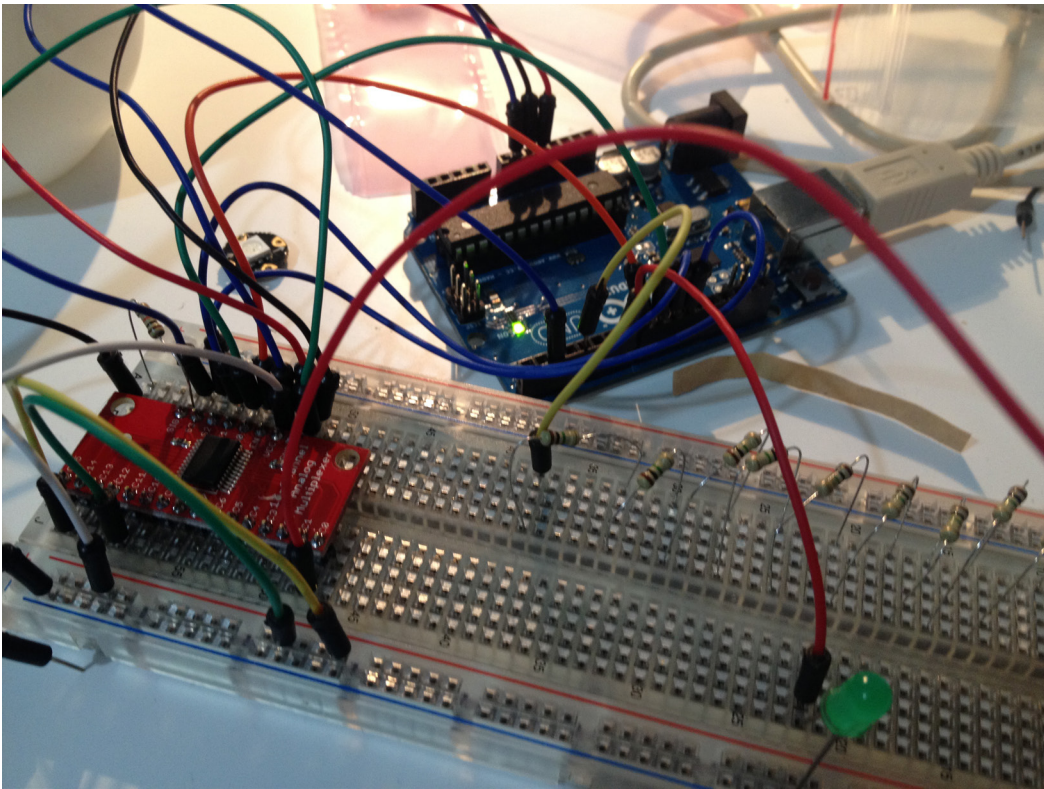


Figure 6: Multiplexor on Breadboard



Figure 7: On back side of Board.

8. Library Links

1. Capacitive :

<http://playground.arduino.cc/Main/CapacitiveSensor?from=Main>. CapSense

2. Audio Module:

http://phantasmagorium.net/?page_id=117

3. CD74HC4067 analog multiplexer:

<http://bildr.org/2011/02/cd74hc4067-arduino/#>

4. MAX7219 LED display:

<http://tronixstuff.com/tag/max7219/>

4. Buzzer:

Local Arduino Sound Library

9. Working Video

Video is uploaded on my link at www.lifemachine.net/quizboard.

10. Skills learned

1. How does multiplexer works, and how it can be addressed.
2. How audiomodules can be controlled using Arduino.
3. How capacitive sensing works, (its facinating).
4. How to make bluetooth communication.
5. How LED matrix works.
6. How can be all these things can be combined together using Arduino code and make good/fun project.
7. How does a tone works.
8. Making basic PCB using perforeted board.

11. Future Possibilities

- better performance, energy saving etc.
- add more animations
- modify into a score board
- add adaptation for more multiplexers
- invent learning games based on this platform
(all games which work with random numbers or dice)