The goal of this project is to create an instrument that would allow a user to create their own, unique rhythms. This instrument has 12 alligator clips; each of them will play a different beat continuously when it touches a conductor. Using buttons on the breadboard, it is possible to change the delay between consequent sounds for each clip, as well as how many times the sound sample will play until the delay.

How it works: the touch sensor sends 12 bits to Arduino as output – one bit for each number. The Arduino algorithm sends this data to PD patch, along with another 12 numbers that indicate the amount of repeats for each sound sample. Repeats are implemented in the patch itself, using the “metronome” object, which periodically sends out signals. Delays are implemented in a different way – each sound sample has a number assigned to it. Pressing buttons can increase or decrease it, and additionally, it is decreased by a fixed number at every iteration of Arduino while(True) loop. While this number is greater than 0, Arduino sets the value of the respective bit to 0 – it’s the same as not touching the clip. However, when this number reaches 0, it is set back to its default value and PD patch receives the original value for that bit.

How it was developed: We were inspired by generative music – ever-different music, created by a special system. Initially, we wanted to create an instrument that would randomly generate rhythms, but then we decided to give users more control of the music.

Future improvements:

* Add pre-made background music;
* Improve user interface, make the controls more intuitive;

Challenges:

* Implementing repeats – PureData doesn’t have an object for that, and we had to design it ourselves;
* Hardware optimization – Arduino has 18 input ports, but this was not enough for all the buttons;
* Not getting confused in the wiring

BIG BUTTONS

Set the value that SMALL BUTTONS change

TOUCH SENSOR

Sends 12 bits – one for each alligator clip

SMALL BUTTONS

Used to change the delay/number of repeats

SOUND OUTPUT

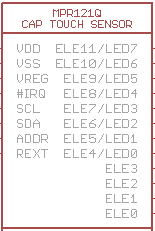
PUREDATA

ARDUINO

DETACHED SMALL BUTTON

Sets the clips, which parameters are changed by other small buttons –

first 6 or last 6

Hardware:  - Adafruit MPR121 touch sensor;

Software: Adruino IDE – Development Environment for Arduino;

PureData – visual programming language, used for creating computer music

VMPK – virtual MIDI keyboard