Getting Started With Sonic Pi

1 Credits

These materials were created by borrowing liberally from:

https://projects.raspberrypi.org/en/projects/getting-started-with-sonic-pi

https://coderdojo-nijmegen.nl/wp-content/uploads/2015/04/LES-1-Sonic-Pi-Je-eerste-geluiden-met-Sonic-Pi.pdf

http://kata.coderdojo.com/wiki/Sonic_Pi_Doctor_Who

2 What is Sonic Pi?

Sonic Pi is a programming language that represents a synthesizer in a computer. A synthesizer, or synth for short, is a machine that produces artificial tones. Sometimes the term digital tone generator is used.

Sonic Pi is an open-source programming environment, designed for creating new sounds with code in a live coding environment; it was developed by Dr Sam Aaron (http://sam.aaron.name/) at the University of Cambridge. He uses the software to perform live with his band. This resource will help get you started with the basics of Sonic Pi so that you can code your own music.

A full Sonic Pi tutorial is found online at http://sonic-pi.net/tutorial.html, Sam Aaron even wrote a freely downloadable book, it is available on https://raspberrypi.org/magpi-issues/Essentials_Sonic_Pi-v1.pdf .

3 Before you begin

- Make sure you have installed Sonic Pi as described in the day 1 document **Installing Sonic Pi on Windows.docx**

4 What you will learn

By following this Getting Started with Sonic Pi tutorial on your computer, you will learn:

- To make sounds by typing text into Sonic Pi
- To loop a tune so that it repeats
- What MIDI note numbers are and how to convert them to music notes and sheet notation

Everything you learn is broken down into bite sized pieces; the term Sushi Card, or just Sushi, is used for this, borrowing from the bite sized Japanese Food Sushi.

At the end of the tutorial we will challenge you to write a tune.

5 Step by Step instructions

5.1 Sushi 1 - First sounds with Sonic Pi

We will learn now how to play sounds in Sonic Pi; let's look at the programming environment first.

This is the Sonic Pi interface; it has three main windows. The largest one is for writing your code, and we call it the Programming Panel. There is also an output panel that displays information about your program as it runs. When you click on the help button at the top of the window, the third panel appears along the bottom displaying help documentation. This contains information about different code you can try and use, as well as different synth sounds, samples, and much more.

Launch Sonic Pi from the desktop or applications menu.

Select Buffer 1 and type:

```
play 60
```

Click on the play icon at the top of the screen. What happens?

What happens if you type `pley 60` and click on the play icon?

This is an example of a bug in your code. In later activities, if the error panel displays text you will know that you have a bug that you need to fix. It could be that you have misspelt a word like `play`. Now type:

```
play 60
play 67
play 69
```

Click on the play icon at the top of the screen. What happens?

The computer is playing each note in sequence (one after the other), but it is happening so fast that to us they sound like they are playing at the same time.

We need to tell the computer to pause between each note. We can do this by typing the following after each `play`:

```
sleep 1
```

The value entered after the word `sleep` represents time in seconds. Using the value 1 represents one second. What would you type for half a second? Now write a sequence of play and sleep to make a cool-sounding tune!

5.2 Sushi 2 - Loop a tune

Now you have mastered the basics of Sonic Pi, let's code a tune!

Select Buffer 2 from the list of buffers below the main window

1.1.1 Repeat a Tune twice

1. Type the following code:

```
play 60
sleep 0.5
play 62
sleep 0.5
play 64
sleep 0.5
play 60
sleep 0.5
```

2. Now click on the play icon at the top of the screen and it will play the first part of a tune. Can you tell what it is? Answer: Frère Jacques!

   This first section plays twice. How could you repeat it? You could type the same section out again, or we could start to introduce loops to your code.

3. At the top of your code, above the first `play 60`, type:

```
2.times do
```

4. And at the bottom of your code, below `sleep 0.5`, type:

```
end
```

5. Click on the play icon at the top of the screen. What happens?

Let's play this part in Sonic Pi.

In the example below, you can see that some lines of code are indented. This makes it easier to read your code, and check for any bugs if it does not work when you press the play button.

You can press the spacebar twice to indent a line of code.

```
2.times do
  play 60
  sleep 0.5
  play 62
  sleep 0.5
  play 64
  sleep 0.5
  play 60
  sleep 0.5
end
```

5.2.1 Loop a tune forever?

Looping notes for a set number of times is certainly useful, but what if you want to loop your tune forever?

Instead of using `2. times do` and `end` you can use `loop do` and `end`, like this:

```
loop do
  play 60
  sleep 0.5
end
```

5.3 Sushi 3 - MIDI notes and music notes

The values that you have been typing after the word `play` represent notes; in fact, they are MIDI note numbers. This means we can translate songs played on a piano into Sonic Pi using a table like this:

`C D E C` or `60 62 64 60` in MIDI notes.

Note	Octave										
	-1	0	1	2	3	4	5	6	7	8	9
C	0	12	24	36	48	**60**	72	84	96	108	120
C#	1	13	25	37	49	**61**	73	85	97	109	121
D	2	14	26	38	50	**62**	74	86	98	110	122
D#	3	15	27	39	51	**63**	75	87	99	111	123
E	4	16	28	40	52	**64**	76	88	100	112	124
F	5	17	29	41	53	**65**	77	89	101	113	125
F#	6	18	30	42	54	**66**	78	90	102	114	126
G	7	19	31	43	55	**67**	79	91	103	115	127
G#	8	20	32	44	56	**68**	80	92	104	116	
A	9	21	33	45	57	**69**	81	93	105	117	
A#	10	22	34	46	58	**70**	82	94	106	118	
B	11	23	35	47	59	**71**	83	95	107	119	

Please read the separate document about representing notes to understand the mapping between piano keys, sheet notation and MIDI numbers.

This is quite a long process if you know the notes of the song you are trying to play. With Sonic Pi you can use standard sheet music notation too.

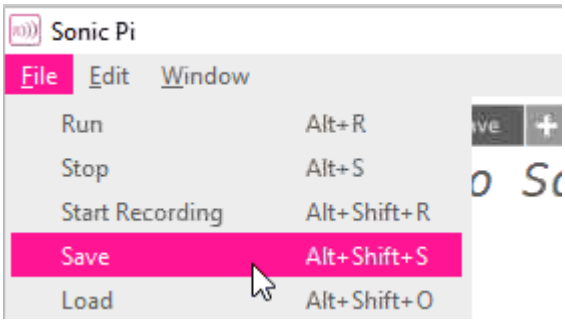
In a new buffer tab type:

```
play :c4
sleep 0.5
play :d4
sleep 0.5
play :e4
sleep 0.5
play :c4
sleep 0.5
```

6 Day 2 – Challenge number 1

Now you know how to play some notes, your challenge is to make a tune.

- Can you take one of your favorite songs and create the melody for it using Sonic Pi?
- Can you write your own song?
- Remember to save your progress.



- Next time we will build on what we have learned!