ECM2415 Software Engineering
Continuous Assessment
Beats by Dr D.

January 2016

1 Assessment

This section describes the assessment structure and criteria for the module.

1.1 Assessment Structure

The assessment is structured as four Scrum *sprints* that each account for 25% of the module mark. At the end of each sprint, a team makes *one* team submission under the *many* BART sheets of its members. The submission dates are as follows:

1. *Sprint 1*: **Thursday February 11th 2016** (Week 5);
2. *Sprint 2*: **Thursday February 25th 2016** (Week 7);
3. *Sprint 3*: **Thursday March 10th 2016** (Week 9);
4. *Sprint 4*: **Thursday March 24th 2016** (Week 11).

A team makes a single submission electronically, using the link provided on the module page. The submission must include all of the ".java" source files and instructions necessary to build and run the product on the Java implementation available in the Harrison Blue

Room *without* the need to use any integrated development environment or additional library. The Harrison Java implementation consists of the compiler, "`javac`" (currently, version `1.6.0_37`), and the runtime, "`java`" (currently, version `1.7.0_95`).

1.2 Assessment Criteria

The assessment criteria consider the contribution that each team member makes to the process and to the product over four sprints, each worth 25% of the total mark.

1.2.1 Contribution to the Process

The contribution to the process accounts for 15% of the sprint mark. Assessment considers to what extent, at observed meetings, a team member gave:

- *done* — a clear, succinct one-minute account of what useful work they did yesterday to advance the product (33.3%);
- *do* — a clear, succinct one-minute account of what useful work they will do today to advance the product (33.3%);
- *help* — a helpful and supportive attitude with comments that assist others in advancing the product (33.3%).

The observations will be made by a member of staff at a fixed time.

1.2.2 Contribution to the Product

The contribution to the product accounts for 85% of the sprint mark. Assessment considers to what extent, in their identified code, a team member made:

- appropriate use Java coding techniques and data structures (75%);
- appropriate use of Javadoc documentation (10%);
- appropriate use of the JUnit testing framework (15%).

Identification will be made on the basis of Javadoc comments in the Java source code.

2 Requirement

The requirement is to develop a simulation of a *simplified* version of the Yamaha Tenori-ON. The Tenori-ON is a novel musical instrument that combines control and display functions in a matrix of 256 LED buttons. Descriptions of its operation are available in printed manuals (T. Iwai and Yamaha) and in demonstrations on the `youtube` site. You should watch

`http://www.youtube.com/watch?v=jx6-oSBT7fc`

and

`http://www.youtube.com/watch?v=WGR1fbCZFdE`

before reading further. The simulation will be called the Simori-ON.

2.1 Architecture

Physically, the Simori-ON has: an "`ON`" button; eight mode buttons, "`L1`", "`L2`", "`L3`", "`L4`", "`R1`", "`R2`", "`R3`", "`R4`"; a 1×32 LCD display; an "`OK`" button; and a central 16×16 matrix of illuminated buttons. For convenience, in what follows the rows and columns of the matrix will be numbered, but these numbers do not appear on the instrument itself. See Figure 1.

Logically, the Simori-ON has 16 layers, one of which is the current layer. Each layer consists of a 16×16 grid and has its own General MIDI channel (a number in the range 1 — 16), voice (one of the 128 conventional and 47 percussion instruments), and velocity (a number in the range 0 — 127).

2.2 Operation

2.2.1 On/Off Mode

Initially, a Simori-ON is in **On/Off Mode**. In this mode, the "`ON`" button is enabled and all of the mode buttons are disabled. All of the matrix buttons are cleared. A Simori-ON may be switched on by pressing the "`ON`" button, after which it continues to **Performance Mode** (see Section 2.2.2). In any mode other than **On/Off Mode**, a Simori-ON may be switched off by pressing the "`ON`" button, after which it continues to **On/Off Mode** (see Section 2.2.1).

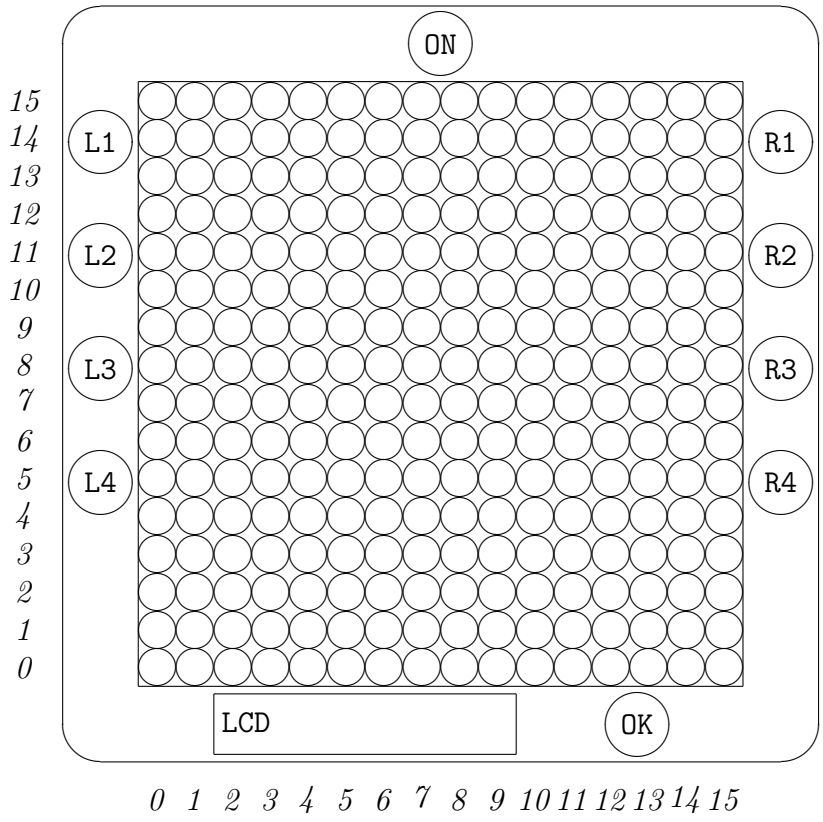

Figure 1: The Simori-ONarchitecture.

2.2.2 Performance Mode

In **Performance Mode**, the current layer is displayed by setting and clearing matrix buttons. Pressing a matrix button causes it to be set and illuminated in orange. Pressing this button again, causes it to be cleared and not illuminated. The corresponding changes are made to the current layer. See Figure 2. A "clock hand" continuously loops from left to right at a set speed (see Section 2.2.5) as far as a set loop point (see Section 2.2.6), playing the notes described by each layer on its channel, using its voice with its velocity. Notes in higher rows have higher pitch. See Figure 3.

2.2.3 Change Voice Mode

In **Performance Mode**, a Simori-ON may be switched to **Change Voice Mode** by pressing the "L1" button. In this mode, all matrix buttons are cleared. Pressing a matrix button causes it and all those in the same vertical/horizontal line (only) to be set. See Figure 4. The coordinates of the pressed matrix button are used to choose an instrument from the 128 conventional and 47 percussion instruments given in the General MIDI specification. The name of the chosen instrument is displayed on the LCD display. Pressing the "OK" button causes the Simori-ON to set the voice for the current layer to be the chosen instrument and then to continue to **Performance Mode** (see Section 2.2.2).

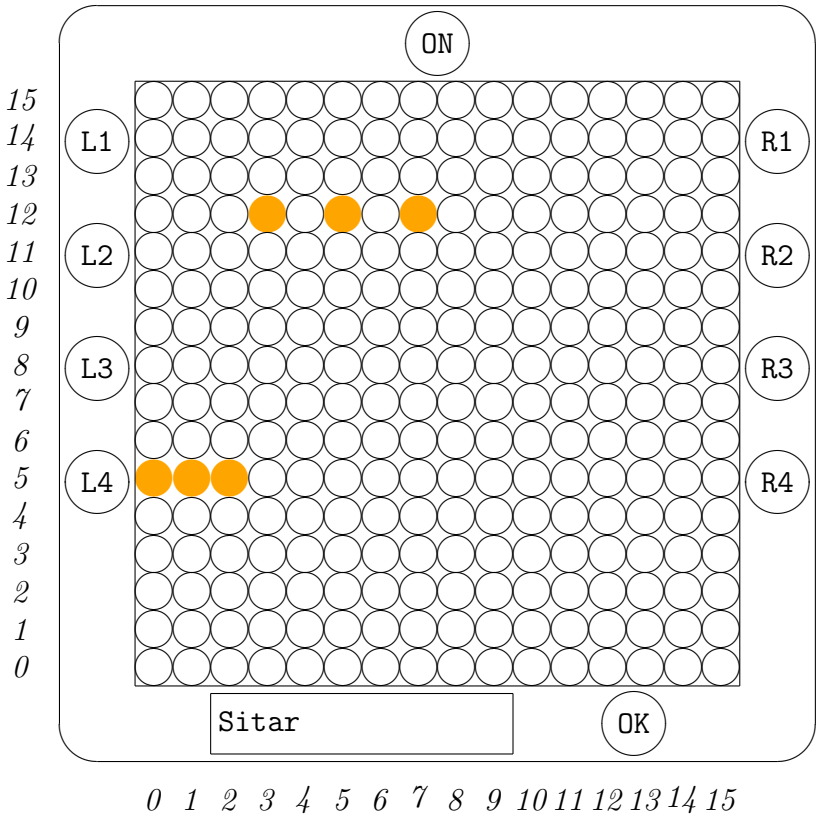

Figure 2: Performance mode.

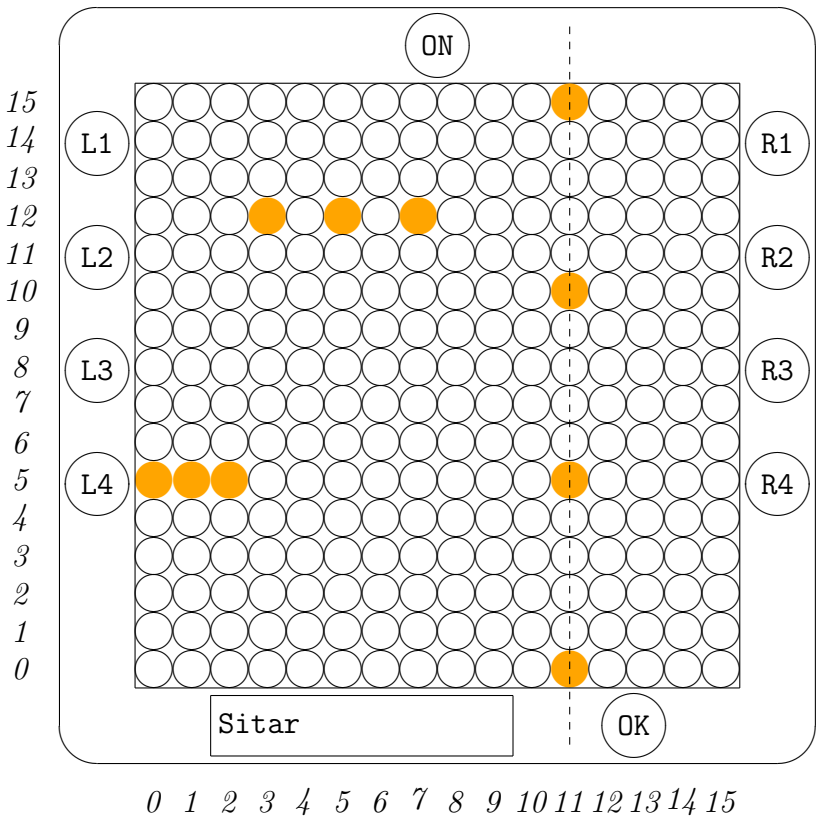

Figure 3: The clock hand.

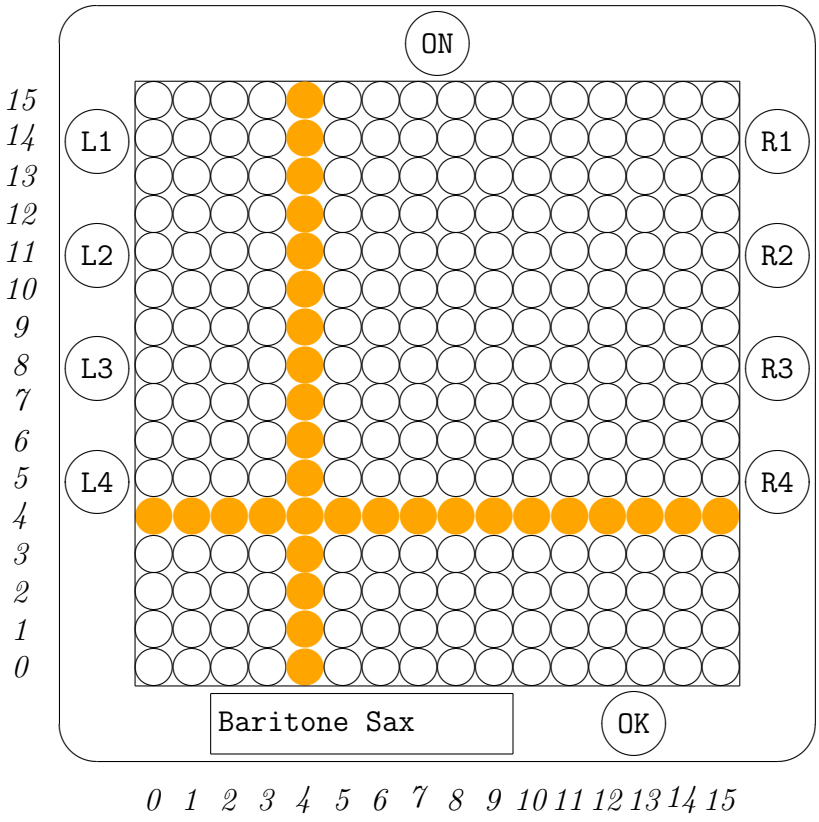

Figure 4: Change voice mode.

2.2.4 Change Velocity Mode

In **Performance Mode**, a Simori-ON may be switched to **Change Velocity Mode** by pressing the "L2" button. In this mode, all matrix buttons are cleared. Pressing a matrix button causes it and all those in the same vertical/horizontal line (only) to be set. See Figure 5. The coordinates of the pressed matrix button are used to choose a note velocity

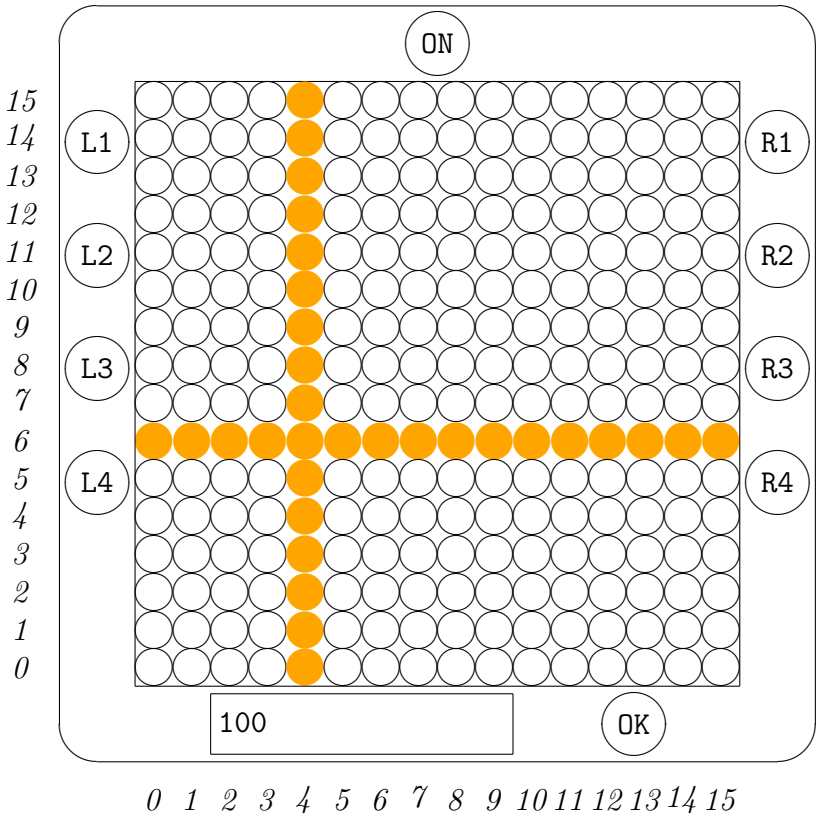

Figure 5: Change velocity mode.

in the range 0 — 127. The note velocity is displayed on the LCD display. Pressing the "OK" button causes the Simori-ON to set the note velocity for the current layer to the chosen note velocity and then to continue to **Performance Mode** (see Section 2.2.2).

2.2.5 Change Loop Speed Mode

In **Performance Mode**, a Simori-ON may be switched to **Change Loop Speed Mode** by pressing the "L3" button. In this mode, all matrix buttons are cleared. Pressing a matrix button causes it and all those in the same vertical/horizontal line (only) to be set. See Figure 6. The coordinates of the pressed matrix button are used to choose a loop speed in the range 0 — 160 beats-per-minute. A loop speed of zero silences the instrument. The loop speed is displayed on the LCD display. Pressing the "OK" button

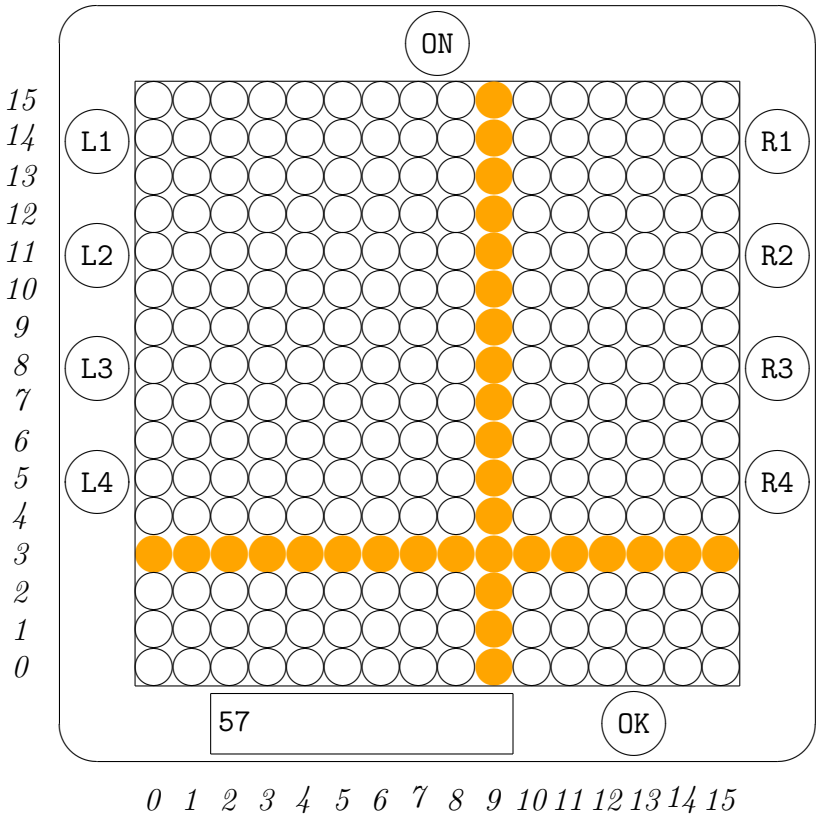

Figure 6: Change loop speed mode.

causes the Simori-ON to set the loop speed, and then to continue to **Performance Mode** (see Section 2.2.2).

2.2.6 Change Loop Point Mode

In **Performance Mode**, a Simori-ON may be switched to **Change Loop Point Mode** by pressing the "L4" button. In this mode, all matrix buttons are cleared. Pressing a matrix button causes it and all those in the same vertical line (only) to be set. See Figure 7. The position of the pressed matrix button is used to choose a loop point in the

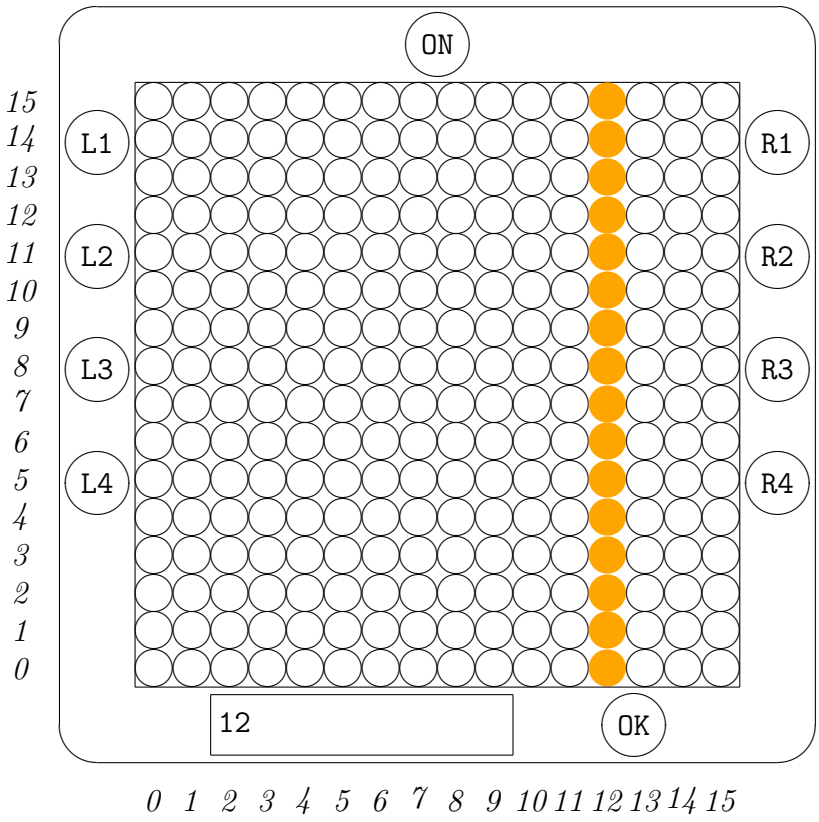

Figure 7: Change loop point mode.

range 0 — 15. The clock hand will loop back to zero from this point. The loop point is displayed on the LCD display. Pressing the "OK" button causes the Simori-ON to set the loop point and then to continue to **Performance Mode** (see Section 2.2.2).

2.2.7 Change Layer Mode

In **Performance Mode**, a Simori-ON may be switched to **Change Layer Mode** by pressing the "R1" button. In this mode, all matrix buttons are cleared. Pressing a matrix

button causes it and all those in the same horizontal line (only) to be set. See Figure 8. The position of the pressed matrix button is used to choose a layer number in the range

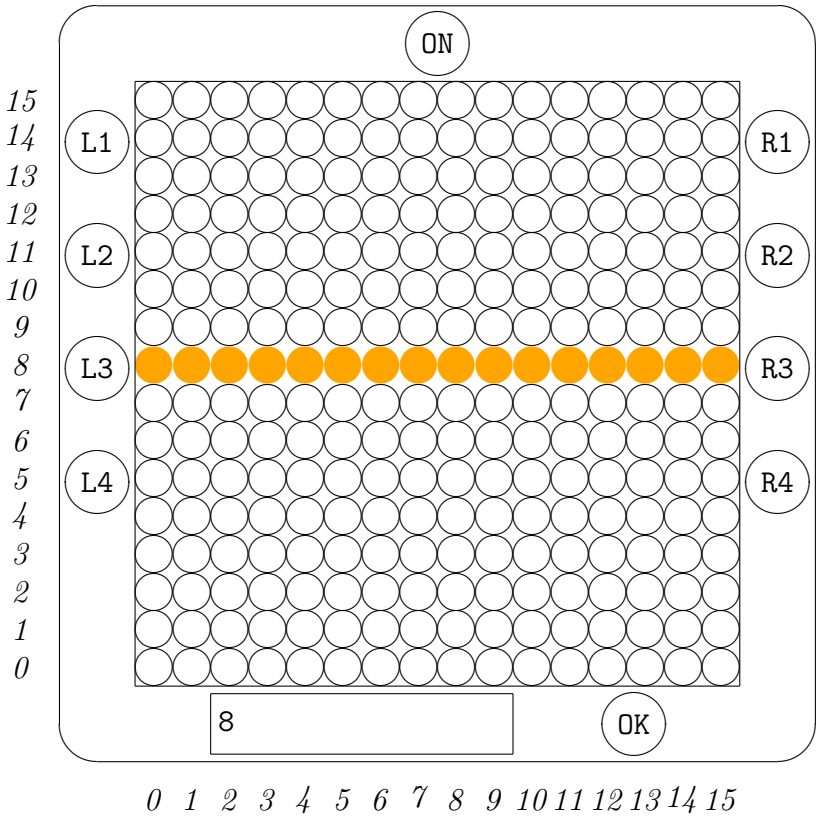

Figure 8: Change layer mode.

0 — 15. The layer number is displayed on the LCD display. Pressing the "`OK`" button causes the Simori-ON to set the current layer to the chosen layer number and then to continue to **Performance Mode** (see Section 2.2.2).

2.2.8 Save Configuration Mode

In **Performance Mode**, a Simori-ON may be switched to **Save Configuration Mode** by pressing the "`R2`" button. In this mode, all matrix buttons are cleared. Pressing a matrix button causes it and all those in the same vertical/horizontal line (only) to be set. See Figure 9. The coordinates of the pressed matrix button are somehow used to edit the individual characters of a filename — it is for you to decide precisely how — which will be given a "`.song`" extension. Pressing the "`OK`" button causes the Simori-ON to save its entire configuration in the named file and then to continue to **Performance Mode** (see Section 2.2.2).

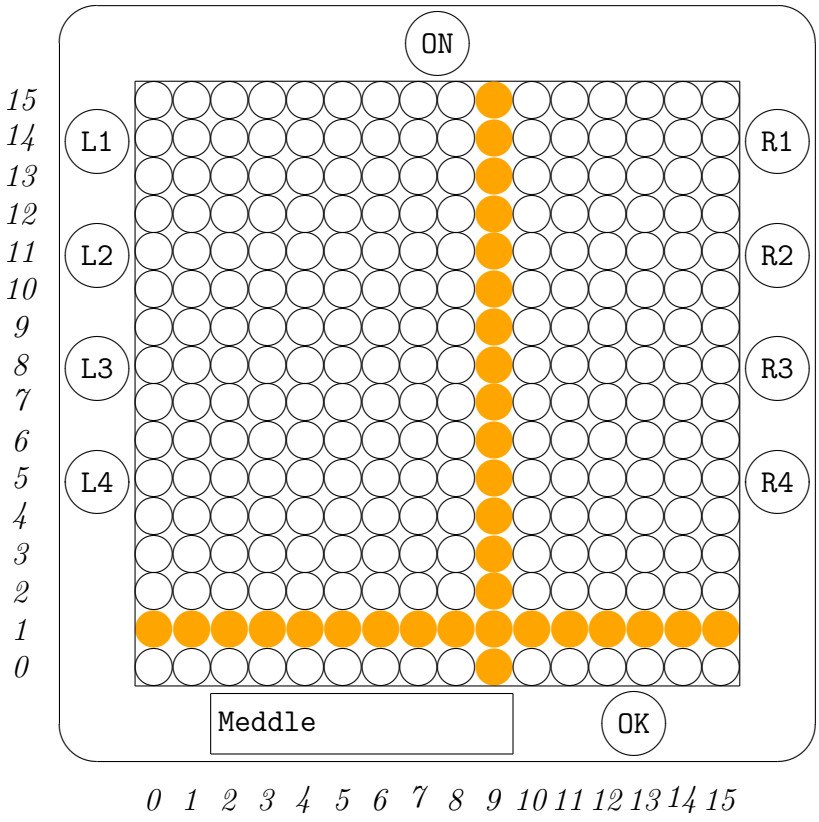

Figure 9: Save configuration mode.

2.2.9 Load Configuration Mode

In **Performance Mode**, a Simori-ON may be switched to **Load Configuration Mode** by pressing the "R3" button. In this mode, all matrix buttons are cleared. Pressing a matrix button causes it and all those in the same vertical/horizontal line (only) to be set. See Figure 10. The coordinates of the pressed matrix button are somehow used to edit

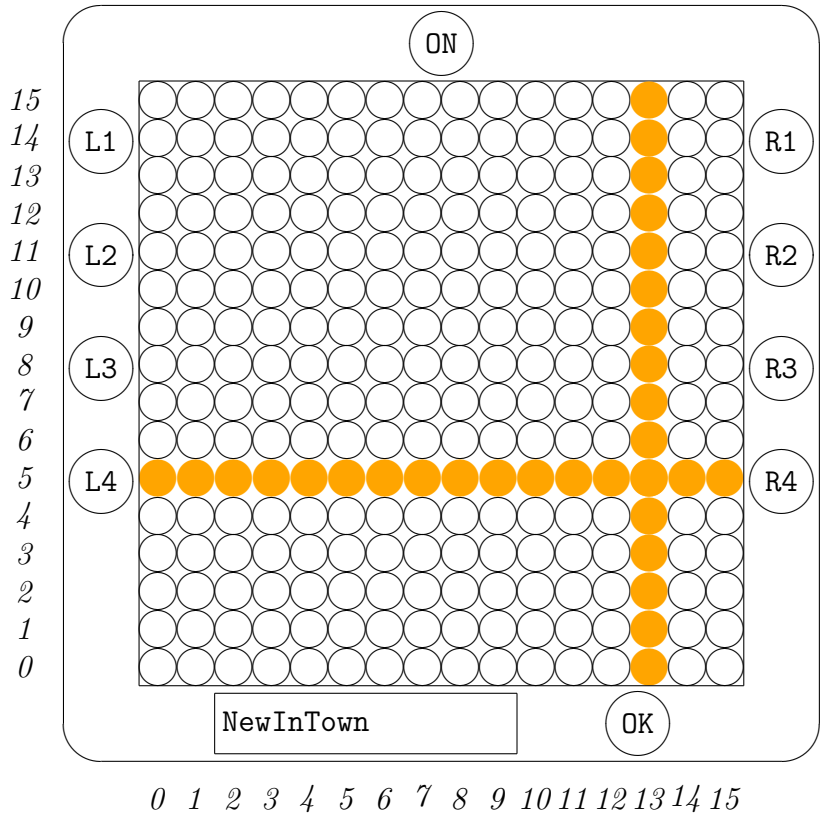

Figure 10: Load configuration mode.

the individual characters of a filename — it is for you to decide precisely how — which will be given a ".song" extension. Pressing the "OK" button causes the Simori-ON to load its entire configuration from the named file and then to continue to **Performance Mode** (see Section 2.2.2).

2.2.10 Master/Slave Mode

In **Performance Mode**, a Simori-ON may be switched to **Master/Slave Mode** by pressing the "R4" button. In this mode, all matrix buttons are cleared. The Simori-ON (hereafter, the "master") probes for any other Simori-ON on the same local area network and selects the first to respond (hereafter, the "slave"). A Simori-ON listens for network

connections on port 20160. The master then copies its entire configuration to the slave and continues to **Performance Mode** (see Section 2.2.2).

References

T. Iwai and Yamaha, *TENORI-ON Quick Guide*, Yamaha Corporation, Available via `http://download.yamaha.com/search/result/?search=TENORI-ON`. Accessed 25/08/15.