ED Workshop

Concept Review

Salu Ylirisku

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**Aalto University
School of Electrical
Engineering**

Common Sessions

ED Workshop (Wednesdays 10-12 @TU5)

1. Kick-off
2. Useful Games Workshop
3. Ideation Workshop
4. ~~Gaming Workshop~~ Back to school WS
5. Gaming Workshop
6. **Concept Review**

Exam week (no lectures)

Sähköpaja (Mondays 10-12 @TU2) in FINNISH

1. Introductions
2. Teaming up, Arduino examples
3. Basics of Arduino programming
4. Sensors
5. 3D printing and OpenSCAD
6. Radio technology and Freakduino
7. Aalto Ventures Program
8. Aaltonaut, prototyping
9. Arduino buses (SPI, I2C, UART)
10. Arduino radios
11. Laser cutting, PCB making
12. Basics of electronics
13. User interfaces, measuring tools

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Concept Review

- **Assignment:**
  - Choose your game to be prototyped (one / team)
  - Update the game description (the idea, rules, gameplay, utility)
  - Communicate the game idea visually (what are the physical components)
  - Choose the technical components for your project (negotiate with an assistant), budget max 100 € / team
  - Create state and flow/sequence diagrams for the game (look for examples online) and be prepared to present these on the next time. Use the draw.io online tool or similar.

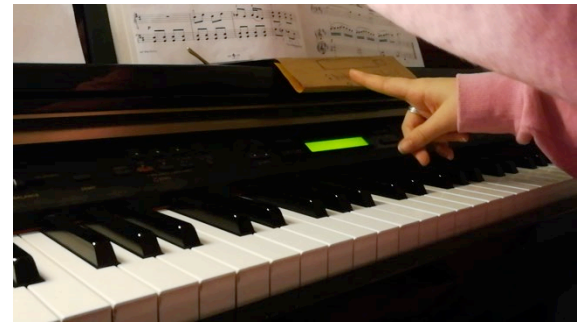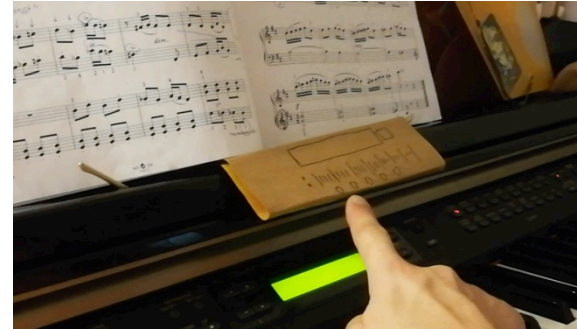- **Present your game and details to the others**

Piano Coach

Utility

This is a device that helps beginning piano players to learn to play tunes.

The idea

Piano Coach is a device that sits on the note sheet holder. It reads a barcode on a notes sheet and then guides a learner through the song on a set requirement level.
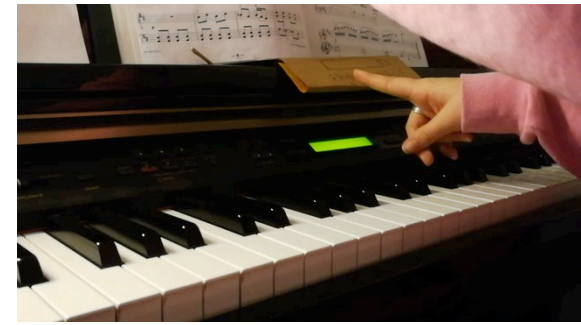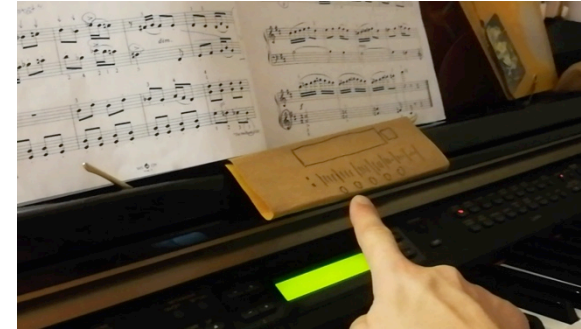
Piano Coach

The rules

In order to complete a song, the learner needs to be able to perform the full song with less errors than set into the device. To navigate through a song, one needs to rehearse each bar according to the following criteria:
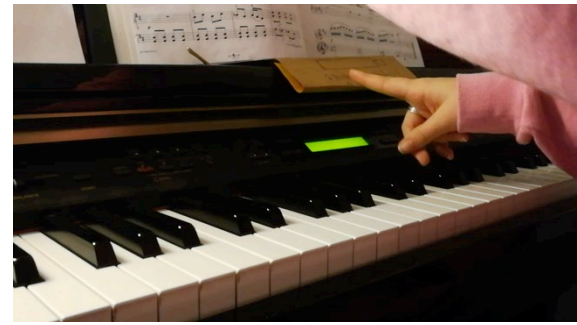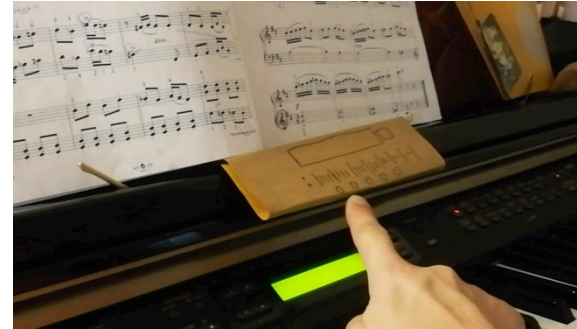
1. **Right hand – correct sequence required x2 (errors in rhythm allowed)**

2. **Right hand – correct rhythm required x2 (1 error in notes allowed)**

3. **Right hand – full correct play required x1 (no errors allowed)**

4. **Left hand ...**

5. **Both hands ...**

6. **Move to the next bar in this way, until 4 bars completed**

7. **Full 4 bars correct play required**

8. **Move to the next bar in this way, until 4 more bars completed**

9. **Full song until here, correct play required**

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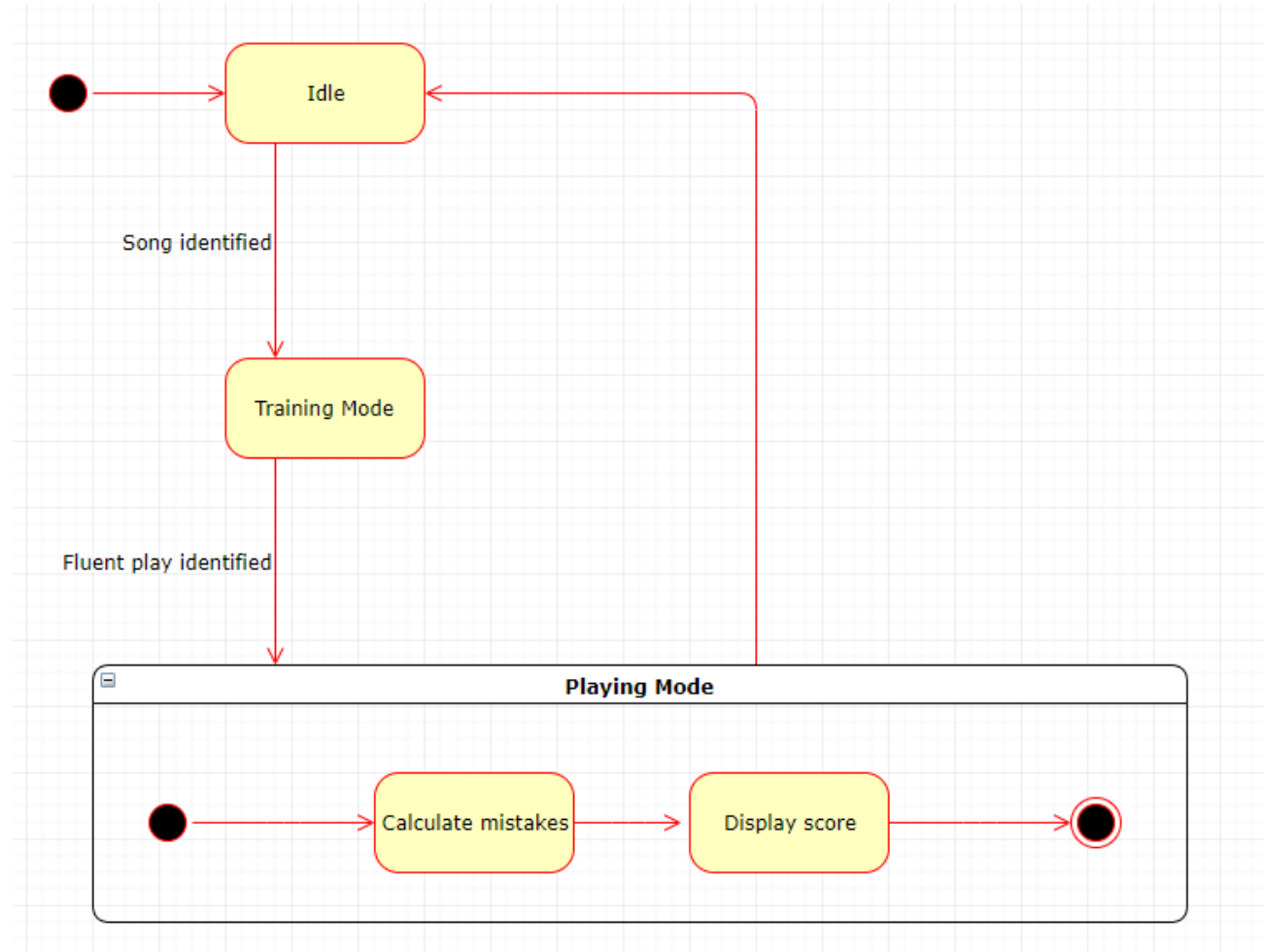School of Electrical
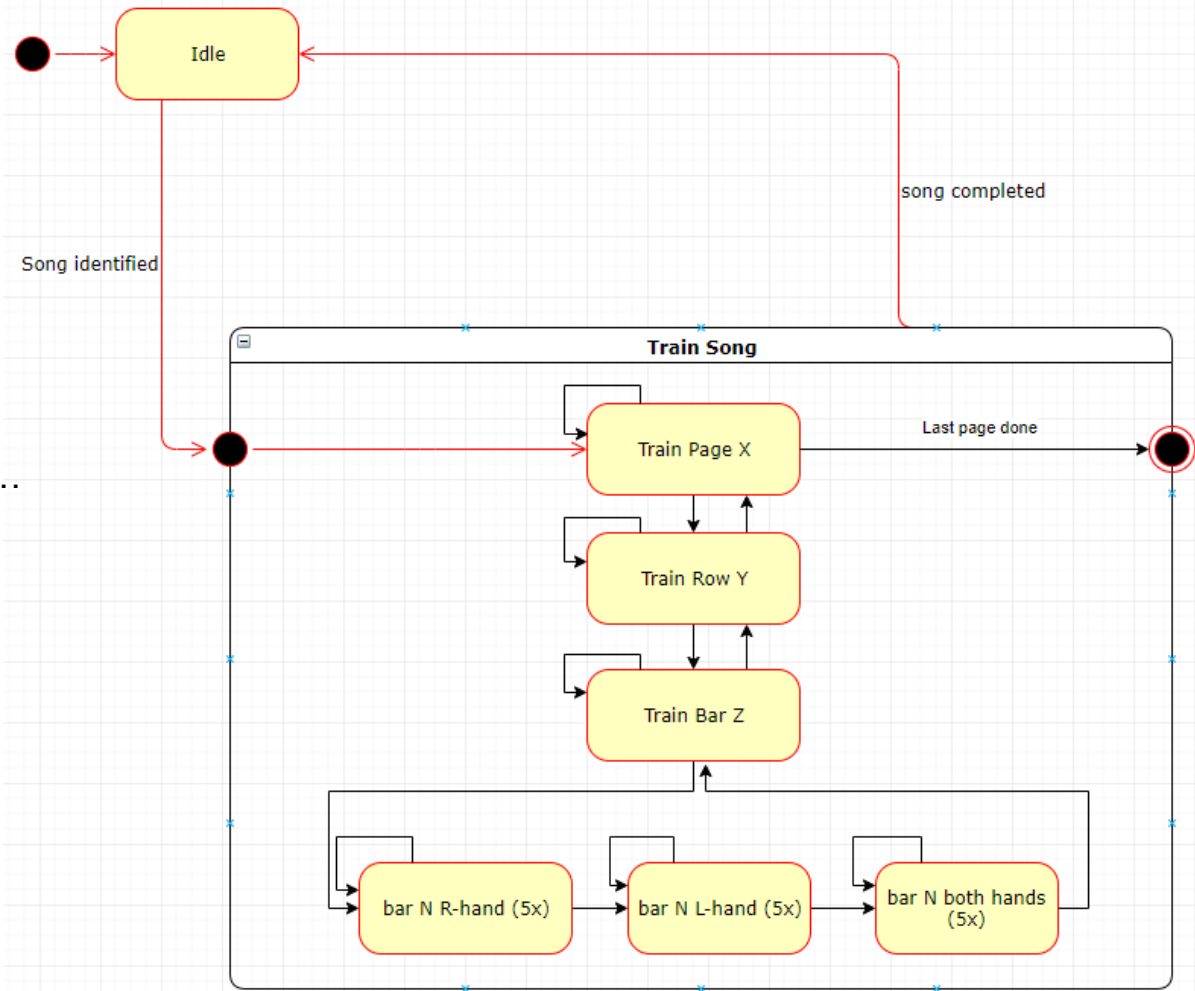Engineering

Piano Coach

Gameplay

1. The player starts the device with an on-switch. Then they scan the notes sheet. Device says 'beep' and the name of the song appears to the LCD, if the song is identified.

2. Setting the requirement level. Button + navi + button.

3. Starting the game. The game has two main modes: training mode and playing mode. The mode is automatically chosen based on the player performance. If one plays only the right hand with errors in notes and rhythm, the device expects the player to be learning, and it returns to the start of the bar once the end of the bar is reached. Otherwise the device is in playing mode.

4. In the end of the performance the player is given error score, e.g. SCORE 1.
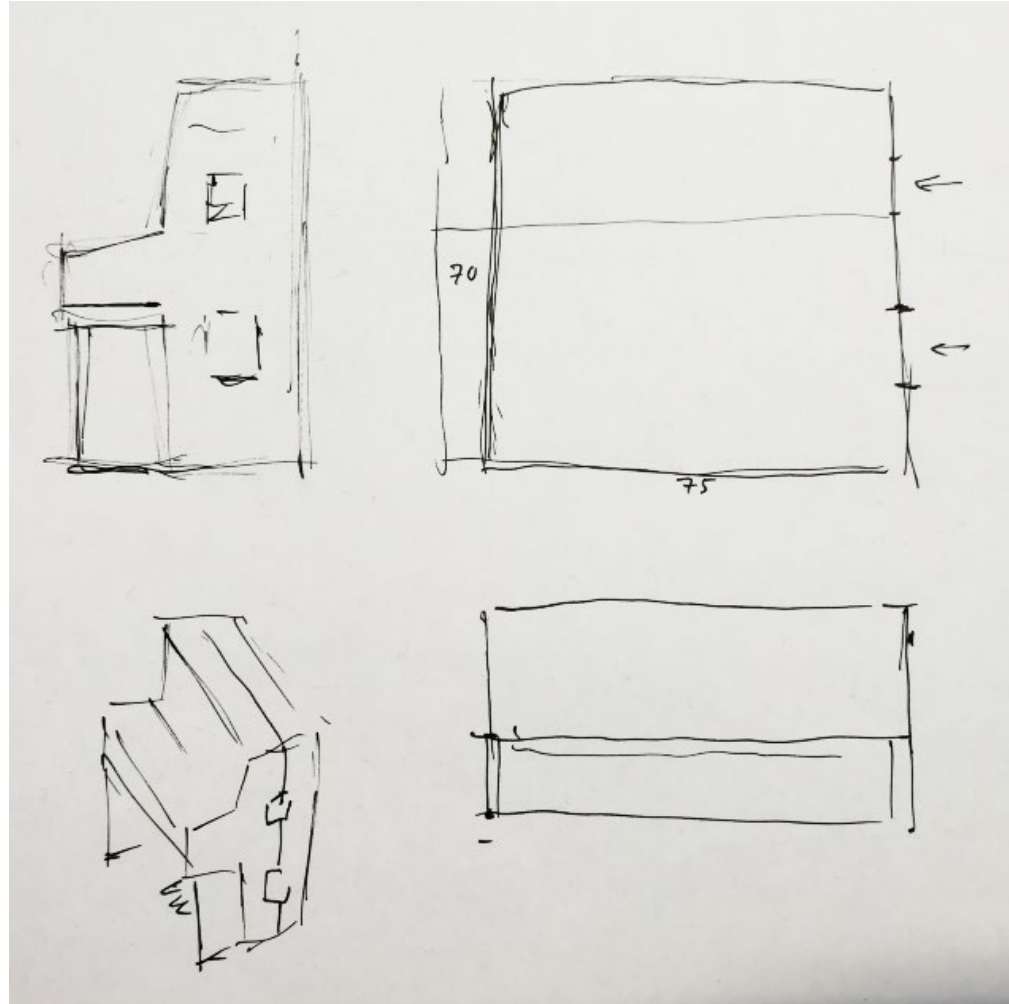
State diagram

State diagram

This needs to be rethought…

3D sketching (front, side, top) – 1:1

Task for next time

1. **Order components (verify with assistant)**

2. **Create a 1:1 mock-up**
   - Include all main parts, e.g. board, battery,…

3. **Place that into the intended context**
   - Think of all parts and the interaction
   - Try out the game play physically + take pics

4. **Create 3D model with Fusion360 based on the mock-up**
   - Think of the 3D printing orientation
   - Consider PCB holders and connector holes

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3D modelling – Fusion360

Go through the basic courses to learn Fusion360:

- **https://f360ap.autodesk.com/courses**

You can also study how a professional 3D designer models a case for Arduino:

- **https://www.youtube.com/watch?v=E0bhdr84FNU**
- The example is super fast! If you follow the modelling, you will need to pause and replay many times

Reminder

- **You must have a team assistant**
    - Only one team has reported their assistant
- **You must return assignments on time**
    - Missing the deadlines / assignments -> reduced grade