Notes

- check Chuck - music programming language
- Ideas of setup
  - for session view Launchpad (Quneo) should be enough
  - for arrangement view keyboard and/or pads
  - checkout launchpad95 script
- Arturia
  - seems to make pretty cool devices fairly priced. Most have VC/Gate output.
- Books
  - The Secrets of Dance Music Production
  - Making Music - 74 Creative Strategies for Electronic Music Producers
- Links
  - http://www.musicradar.com/news/tech/the-best-android-music-making-apps-in-the-world-today-276167
- Magazines
  - Future Music
  - Computer Music
- Audio Interfaces
  - **Behringer UMC204HD**
  - Novation Audiohub 2x4
    - 4xRCA outputs, 3x USB hub,
  - Focusrite Scarlett 2i4 (2G)
  - ESI UDJ6
- songs to sample
  - Et si tu n'existais pas (Joe Dassin)
  - Black Betty (Tom Jones)

What do you need

- DAW, for example Ableton Live
- MIDI Keyboard
- Studio Headphones or Studio Monitors
- Audio Interface, for example Focusrite (optional)
- Microphone for instruments and/or voice (optional)
  - dynamic microphones used for live gigs, loud sounds, low sensitivity, they don't require power source
  - condenser microphones commonly used in studios, they require power source (48v)

    - phantom power through XLR cables
- Other intruments, for example a Synth (optional)

Controllers

Controllers don't play sounds they only send sound information, usually through MIDI (Musical Instrument Digital Interface), to a device that generates the sounds and an audio interface can play those sounds.

Instruments can play sounds, therefore they can have some or all of the devices: MIDI Controller, Synthesizer, Sequencer, Audio Interface, they are an "Appliance". They do need to be paired with a PC.

Pads and Knobs

There are 2 types of knobs, endless rotary encodes and fixed-position or control knobs. **Encoders** are used to increment or decrement values. Jog wheels are a kind of encoders. **Control knobs** or **Pots** (short for Potentiometers) are used to set absolute values, they can have center detent.

- Quneo
- Arturia BeatStep - https://www.arturia.com/beatstep/overview
    - controller and step sequencer
    - 16 pads (2x8) and 16 encoders (2x8)
    - 16-step analog sequencer
    - connectivity: USB, MIDI, CV/Gate
    - price: 100 E
    - Pro version: ~250 E
- Akai LPD8 (Laptop Pad Controller)
    - 8 pads and 8 Q-Link knobs (they look like Control Knobs)
    - price: 50 E
- Akai APC mini (Ableton Performance Controller)
- Akai APC40 (Ableton Performance Controller)
- Midi Fighter Twister
    - 4x4 clickable encoders
    - Center Detent function so it can be used like a potentiometer with middle LED indicator
    - price: 280 E
- Novation Launchpad & LaunchControl

Keyboards

- **Arturia KeyStep**
  - keyboard controller and polyphonic step sequencer
    - each sequence can have 64 steps, each step can have up to 8 notes
  - can be connected to Novation Circuit
  - connectivity: USB, MIDI, CV/Gate
  - price: 120 E
- Arturia MiniLab Mk II
  - comes with Analog Lab Lite, Ableton Live Lite, UVI Grand Piano Model D
  - 25 slim keys, 8 RGB pads (x2 banks) and 16 encoders (2 clickable), Pitch Bend and Modulation touch strips
  - keys and pads and encoders, but no step sequencer like with Beat- or KeyStep
  - price: 100 E
- Akai APC Key 25 (Ableton Performance Controller with Keyboard)
- Akai MPK mini (Music Performance Keyboard and Pads)
- Novation LaunchKey (mini)

Instruments

Synthesizers

- **Novation Circuit**
  - Hybrid Synth-Drum Machine, Sequencer, Controller
  - allows sample uploading
  - 4 tracks
- Korg Minilogue

Drum Machines

Drum machine is used to create drum patterns outside of your DAW sequencer. As a side note, if your drum machine supports sample upload, most don't, than it can basically become any instrument you want, it gets closer to a sampler.

- **Novation Circuit**
  - Hybrid Synth-Drum Machine, Sequencer, Controller
  - allows sample uploading
  - 4 drum tracks
  - price: 290 E
- Arturia Spark LE
  - price: 200 E
- Elektron Analog Rytm
- Elektron Digitakt

    - can sequence up to 8 external synths
    - allows sample uploading
- Korg Volca Beats
    - entry level
    - can be connected to other Volca synths
    - real analog sound, but not fully analogue (hybrid)
    - only one drum kit, it can be modified in many ways
    - single audio output

`*` works only with computer

Samplers

Capable of creating long phrases or whole tracks (as opposed to a drum machine which is capable of creating drum patterns or short phrases). NI Maschine MK3 is an example of a notorious modern (as of 2018) sampler (or Groovebox), usually used as a drum machine. It only works connected to a computer.

- Korg Volka Sample
- Novation Circuit
- Elektron Octatrack

Software

To Check

- Mixbus
- EnergyXT
- Qtractor
- Tracktion 5
- Mulab Free
- Ohm Studio
- PreSonus

DAWs

Ableton Live

Reaper

- unlimited evaluation

LMMS

Linux MultiMedia Studio

Plugins

Free

- Synth1
  - Virtual Analog Synthesizer
- TAL Plugins (Togu Audio Line)
  - TAL NoiseMaker
- W1 Limiter
  - simulation of L1 limiter by Waves
- Rough Rider
  - aggressive compressor
- Magical 8bit Plug
- Alchemy Player
- iSpinner
- LoudMax

Popular

- Serum
- Synth1

DJ

VirtualDJ

Use quneo's vertical slider to control LPF of the filter knob:

```
  var "$shift" ? nothing : param_multiply 0.5 & param_greater 47% ? deck left eq_low 50% :
deck left eq_low
```

Serato DJ

See `serato.md` file.

Music Theory

Freq Guide

- 20-50Hz Sub-bass
  - you feel this range rather than hear it
- 50-250Hz Bass
  - here is usually the bass boost in most apps and appliances
- 250-800Hz Muddy
  - between bass and mid-range
- 800-6000Hz Mid
  - human ear is very sensitive to it
  - 4kHz mark - the most sensitive
  - very small adjustments here have a big impact
- 6000-8000Hz Treble
  - control the brightness of the track
  - the magic frequency
  - 50-8000Hz is the most important part of the track
- 8000-20000Hz Ultra-High Treble
  - high hats, the hiss
  - here you get the harshness
  - older people can't really hear this

Tonality and Atonality

Tonal music has a clear tonal center, the "goal note". It's called tonic or the key of the melody. Usually the first and the last note of a melody. It's the first note of the scale used to create the melody.

Atonal music has no clear tonic pitch or goal note.

When we say that a song has a single tonal center or tonic, we also are saying that it is in a single key. It is made from a set of notes that have the tonic pitch as the first note. This set of tones can be arranged in stepwise order as a scale. DO RE MI FA SOL LA SI DO is a scale. As example **C MAJOR** scale means the tonic note is C and the mode is **major**.

Harmonic Function

The most important chord in the key is called the tonic harmony and the tonic pitch is the lowest note of that chord. A chord is multiple notes played together.

Harmony is succession of chords to create a sense of harmony or a story, chords progress to control the creation and resolution of tension. Harmonic function is what the chords "do".

- Tonic = Stable chord (at the beginning and end of the song)
- Predominant = Connecting chord, a chord that prepares the Dominant
- Dominant = Unstable chord (throughout the song and as the second to last chord)

Notation

Chromatic scale: 12 notes, at half step distance.

Middle C = 262 Hz

C4 is called the middle C.

A 7 notes scale has 8 notes, the 8th is same as the 1s up an octave. The interval between the 1st note of a scale and the 5th note is called the **perfect fifth**.

RMS = Root Mean Square

Major Key

- all the white keys in a scale on a piano

Minor Key

- most used in european music, especially dance music
- T, S, T, T, S, T, T
  - T = tone, S = semitone

Measure and Meter Signature

Measure = Bar

Sound Quality

- jitter simulation experiment http://www.sereneaudio.com/blog/what-does-jitter-sound-like
- bluetooth quality http://www.sereneaudio.com/blog/how-good-is-bluetooth-audio-at-its-best

Online Resources

- https://www.musictheory.net/

Music Production

A song has generally sounds in 4 categories:

1. Drums
2. Bass
3. Chords
4. Melodies

Recording

For recording using a microphone you will need microphone (duh), microphone stand, XLR cable, audio interface and a computer with a recording software (DAW or Audacity)

How to Create Chords

- take a note (for example a tonic to get the tonic harmony)
- major chord
  - copy the note 4 positions up
  - copy one more time 3 positions up
- minor chord
  - copy the note first 3 and than 4 positions up
- create a chord progression by copying the chord up on every note of the key
- when creating a loop start with the tonic chord
  - and finish with the 4th or 5th chord
  - use any from 1 to 6 in between

How to Sound musical

Without knowing (too much) musical theory.

Stay in Key

- mark all the notes from a scale in the pianoroll and fold it to see only those notes
  - copy the notes on all octaves

    - move the scale notes off grid so you only see them not hear
- draw your melody, you'll be in key

Chord Progessions

- open a chord progression and disable it
- draw on top of it, you'll be in key and it will probably already sound good
- move octaves down and draw your bass line
- use just the base note for the bass line

Harmony

- find a piece of song you like
- convert it to harmony, it will somewhat resemble the original song
- edit the result until you like it
- use the scale plugin to change the key
- add drums or bass line

Use MIDI Effects in Abelton Live

- Scale Plugin
    - use C minor for example
    - change the note and you will be in that key, for example chose F and you'll have F minor
    - combine it with Chord plugin
- Chord Plugin (Chord Sets)

How to use Samplers

- a sample is a piece of audio of any length between, let's say, half a second and a full song
- it is usually a something like a drum hit, snare or kick for example
- sampling tipically means to get some audio clips into a sampler, and trigger them using MIDI
- you can buy sample packs, cut some pieces from entire songs and use them as samples, or you can create your own samples
- for example in Ableton drag the Sampler instrument onto a MIDI track and an audio clip onto the sampler. Use your keyboard to trigger the sample at different pitches

How to use Synthesisers

- **Serum** is a very popular and famous synth
- for example to create a bass sound, you start with a squared wave from an oscilator
    - so you need and Oscilator

- filter out the high frequencies using a filter, since the bass has only low frequnecies
  - so you need a Filter
- use an envelope to setup the attack and hold, decay and sustain and release when a key is pressed
  - so you need and Envelope
    - attack = the time it takes for the sound to reach it's maximum volume or the fade in time
    - hold = TBD
    - decay = the time it takes to get from the maximum volume to the sustain volume
    - sustain = the main volume of the sound (in dB) when the key is hold
    - release = the time it takes for the sound to fade out when key is released

Mixing and Mastering

- mixing means to balance out all the elements of your final track
  - balance levels
  - balance ferquencies using equalisers
    - take out what clashes
  - control the dynamic range using compression
  - use reverb to make it sound "somewhere" (in a room or in a hall)
- mastering means polishing your final track
  - comes after mixing
  - import back the exported track as audio and polish it further

Music Genres

Kizomba

Sounds and Instruments

- Ableton Live - Muted & Bell Unpitched

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