Can you teach a school class functional programming?

- Programming can make the physical world better
- Carbon mitigation

Can you teach a school class functional programming?

Why?

How?

Conclusion

Why?

”What’s your favorite programming language?”

”Erlang.”

”Really?”

“I feel cheated.”

Nordhemsskolan 1.0

Introduction and communication

#CodeBEAMSTO

What makes programming interesting?

- Infinity of possibilities
- Programming everywhere
- Implement everywhere
- You can’t fail
- Immediate feedback

What should we build/do?

- Chat room
  - Useful
  - Immediate feedback
  - Motivation
  - Nodes

We were super prepared

- Paper sent out 1 week ahead
- Erlang installed on 20 computers
- Main monitor

#CodeBEAMSTO

What is a variable?

```
X = 1
Y = 2
X + Y = 3

Mat = “Bigmac”.
Bigmac = “good”.

Mat == Bigmac => false
Mat == “Bigmac” => true

Lista1 = [1, 2, 3].
Lista2 = [“jag”, ”heter”, ”Tom”].
Lista3 = [“en blandad lista”, 23, true]

lists:sum(Lista1) => 6

1 == 1 => true
1 == 2 => false
2 > 1 => true
```

```
** exception error: no match of right hand side value 1
** exception error: no match of right hand side value 2
** exception error: undefined shell command send/1
* 1: syntax error before: ". \n"
```

”Why do we even do this?”

”What is this good for?”

”When are we going to build something cool?”

Chat room

```
-module(skola).
-export([start/0, message/0, send/2]).

start() ->
    register(message, spawn(skola, message, [])).

message() ->
    receive
        {Pid, Message} ->
            io:format("~p says: ~p~n", [Pid, Message]),
            message();
        _ -> message()
    end.

send(Message, Pong_Node) ->
    {message, Pong_Node} ! {self(), Message}.
```

- Communicate between nodes
- Send chat messages to each other.
- Different parts
    - Mail box
    - Recursion
    - Processes

:)

Evaluation

- Students enjoyed the day
- They especially liked writing messages to each other
    - Everyone got to be involved
    - Easier to keep up
- Wanted to get more info on how and where to start
- Fast learners
- A lot of questions

```
# Welcome to Sonic Pi
play_pattern_timed([:d5,:d5,:d6,:a5,:gs5,:g5,:f5,:d5,
                    :f5,:g5,],
                   [0.1,0.2,0.2,0.4,0.2,0.2,0.3,0.2,0.
play_pattern_timed ([,:d5,:d6,:a5,:gs5,:g5,:f5,:d5,
                    :f5,:g5,],
                   [0.1,0.2,0.2,0.4,0.2,0.2,0.3,0.2,0

var = 0
4.times do
  var = var+1
  if var == 1
```

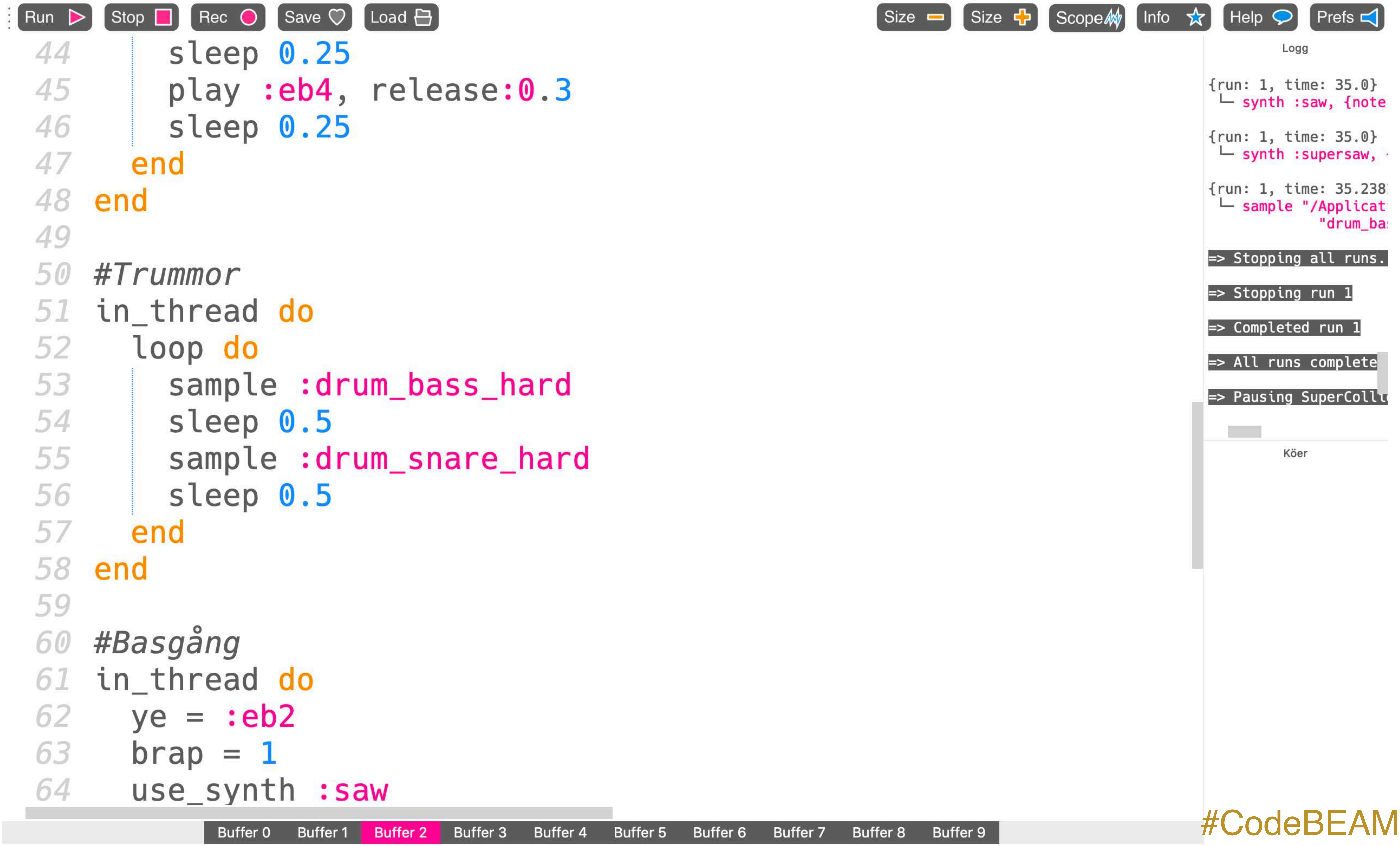
Nordhemsskolan 2.0

Sonic Pi

#CodeBEAMSTO

Sonic Pi

- Sam Aaron, University of Cambridge Computer Laboratory
- Erlang, Ruby
- IDE

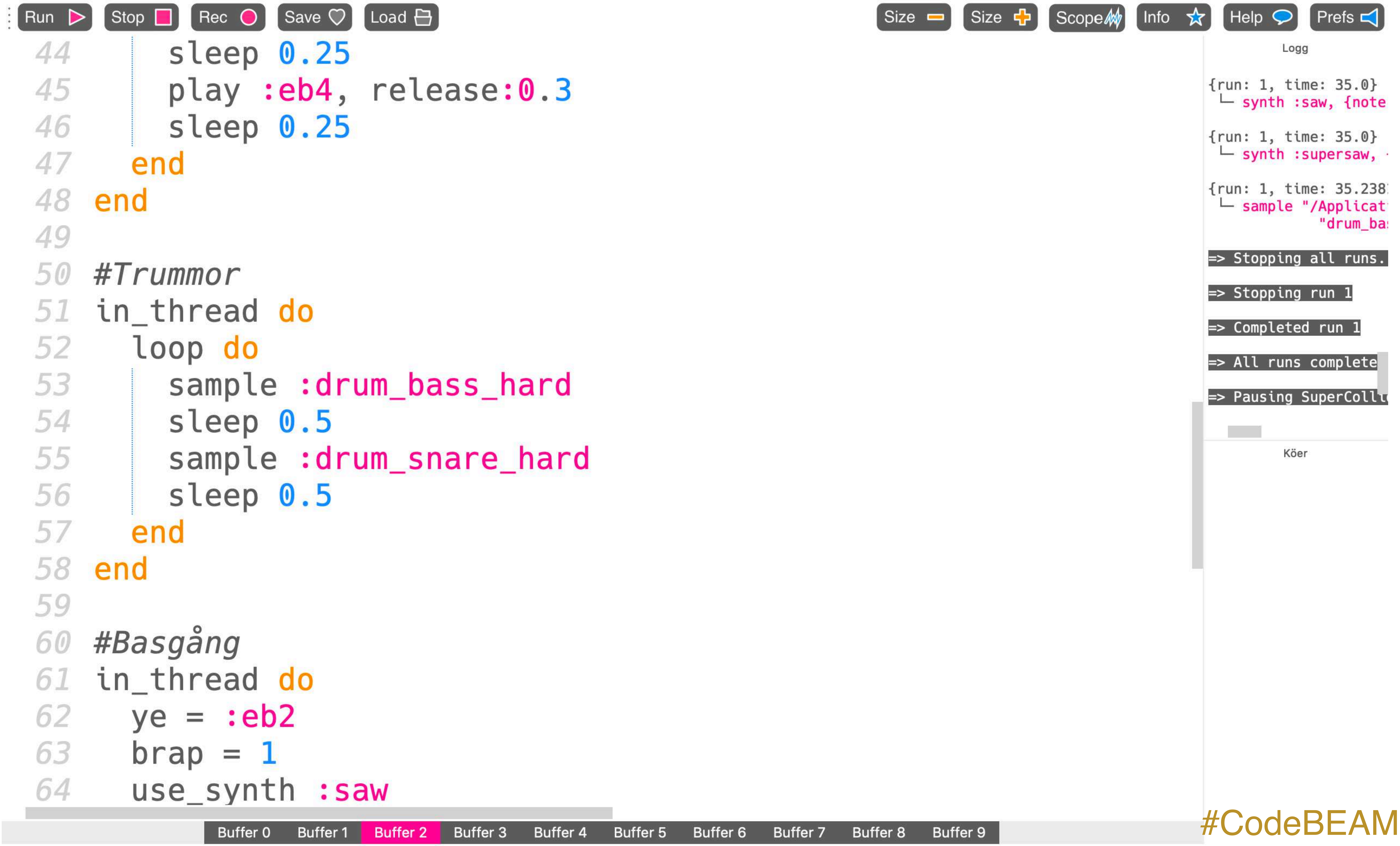


```
    sleep 0.25
    play :eb4, release:0.3
    sleep 0.25
  end
end

#Trummor
in_thread do
  loop do
    sample :drum_bass_hard
    sleep 0.5
    sample :drum_snare_hard
    sleep 0.5
  end
end

#Basgång
in_thread do
  ye = :eb2
  brap = 1
  use_synth :saw
```

```
{run: 1, time: 35.0}
 └─ synth :saw, {note

{run: 1, time: 35.0}
 └─ synth :supersaw, 

{run: 1, time: 35.238
 └─ sample "/Applicat
            "drum_ba

=> Stopping all runs.

=> Stopping run 1

=> Completed run 1

=> All runs complete

=> Pausing SuperColl
```

#CodeBEAMSTO

Sonic Pi v3.1 on Mac



```
    sleep 0.25
    play :eb4, release:0.3
    sleep 0.25
  end
end

#Trummor
in_thread do
  loop do
    sample :drum_bass_hard
    sleep 0.5
    sample :drum_snare_hard
    sleep 0.5
  end
end

#Basgång
in_thread do
  ye = :eb2
  brap = 1
  use_synth :saw
```

```
{run: 1, time: 35.0}
 └─ synth :saw, {note

{run: 1, time: 35.0}
 └─ synth :supersaw, 

{run: 1, time: 35.238
 └─ sample "/Applicat
          "drum_ba

=> Stopping all runs.

=> Stopping run 1

=> Completed run 1

=> All runs complete

=> Pausing SuperColl
```

#CodeBEAMSTO

Sonic Pi v3.1 on Mac

YES.

Conclusion

- Programming as a subject in school
- Learn functional programming first
- Interesting topic
- Purpose

Having fun is more important than how it’s done!

Thanks :)

Email

madeleine@malmsten.eu

Twitter	Github
madde	**mmalmsten**

#CodeBEAMSTO