

Activities

Visual Studio Code

May 4 21:34

FileEditSelectionViewGoRunTerminalHelp

SlidingWindow3.elm - software_foundations - Visual Studio Code

EXPLORER

OPEN EDITORS

SlidingWindow3.elm... 3, M

SOFTWARE_FOUNDATIONS

coq

elm

elm-stuff

src

Example1.elm

Example2.elm

Example3.elm

MergeSort1.elm

MergeSort2.elm

MergeSort3.elm

MergeSort4.elm

MergeSort5.elm

SlidingWindow.css

SlidingWindow1.elm

SlidingWindow2.elm 2

SlidingWindow3.elm 3, M

elm.json

SlidingWindow1.html

SlidingWindow2.html

.gitignore

LICENSE

README.md

term-abstract-ecs.pdf

term-abstract.md

term-abstract.pdf

OUTLINE

TIMELINE

SlidingWindow3.elm X

elm > src > SlidingWindow3.elm > init > data

1 reference

1 module SlidingWindow3 exposing (main, init, update, view)

2 import Browser

3 import Html exposing (Html, Attribute, node, text, div, button, table, tr, td)

4 import Html.Attributes exposing (rel, href, style, class, title, disabled)

5 import Html.Events exposing (onClick)

6 import Array exposing (Array)

7 import List exposing (length, map, filter, foldl, range)

8 import Round

9

10

11

12 -- MAIN

exposed | 3 references

13 main: Program () Model Msg

14 main =

15 Browser.sandbox {init = init, update = update, view = view}

16

17

18

19 -- MODEL

local | 7 references

20 type alias Model = {

21 -- components

22 p: Process Int, -- process P

23 q: Process Int, -- process Q

24 pq: Channel Int, -- channel P->Q

25 qp: Channel Int, -- channel Q->P

26 -- operation

27 who: Array Int, -- whose turn

28 t: Int -- turn

29 }

30

Xs

Us

Ln 68, Col 32

Spaces: 2

UTF-8

LF

Elm

5

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17

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-- MODEL

local | 7 references

type alias Model = {

-- components

p: Process Int, -- process P

q: Process Int, -- process Q

pq: Channel Int, -- channel P->Q

qp: Channel Int, -- channel Q->P

-- operation

who: Array Int, -- whose turn

t: Int -- turn

}

local | 15 references

type alias Process t = {

-- components

send: Array t, -- packets to send

recv: Array t, -- packets recieved

st: Array Int, -- packet send turn

rt: Array Int, -- packet received turn

s: Array Int, -- packet sent?

r: Array Int, -- packet recieved?

-- operation

mode: String, -- acknowledgement process?

w: Int, -- window size (constant)

t: Int -- turn

}

local | 4 references

type alias Channel t = {

-- components

both: Array t, -- packets recieved/to send

} turn management

} data

} extra info

----- "ack" for reciever

Ln 68, Col 32 Spaces: 2 UTF-8 LF Elm

master* 5

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 - src
 - Example1.elm
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 - MergeSort1.elm
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 - MergeSort3.elm
 - MergeSort4.elm
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 - SlidingWindow.css
 - SlidingWindow1.elm
 - SlidingWindow2.elm 2
 - SlidingWindow3.elm 3, M
- elm.json
- SlidingWindow1.html
- SlidingWindow2.html
- .gitignore
- LICENSE
- README.md
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- term-abstract.pdf

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TIMELINE

SlidingWindow3.elm X

elm > src > SlidingWindow3.elm > init > data

```
42 t: Int -- turn
43 }
44
```

local | 4 references

type alias Channel t = {

```
46 -- components
47 both: Array t, -- packets recieved/to send
48 st: Array Int, -- packet send turn
49 rt: Array Int, -- packet received turn
50 s: Array Int, -- packet sent?
51 r: Array Int, -- packet recieved?
52 -- operation
53 sb: Int, -- send start
54 se: Int, -- send limit
55 t: Int -- turn
56 }
57
```

local | 1 reference

type alias Packet t = {

```
58 i: Int, -- number
59 m: t -- message
60 }
61
62
```

exposed | 4 references

init: Model

init =

1 reference

```
65 let data = range 1 54
66 n = length data
67 p = initProcess 0 "def" 5 data
68 q = initProcess 0 "ack" 9 (map negate data)
69 pq = initChannel 0 3 5 n
70 qp = initChannel 0 3 5 n
```

data

extra info

channel loss control

point in file

data



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 - SlidingWindow2.elm 2
 - SlidingWindow3.elm 3, M
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- SlidingWindow1.html
- SlidingWindow2.html
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elm > src > SlidingWindow3.elm > init > data

```
61 }
62
63 exposed | 4 references
64 init =
65   1 reference
66   let data = range 1 54
67       n = length data
68       p = initProcess 0 "def" 5 data
69       q = initProcess 0 "ack" 9 (map negate data)
70       pq = initChannel 0 3 5 n
71       qp = initChannel 0 3 5 n
72       who = Array.fromList [3, 2, 1, 0] in
73   Model p q pq qp who 0
74
75 local | 4 references
76 initProcess: t -> String -> Int -> List t -> Process t
77 initProcess d mode win data =
78   1 reference
79   let n = length data
80       send = Array.fromList data
81       rcv = Array.repeat n d
82       z = Array.repeat n 0 in
83   Process send rcv z z z z mode win 0
84
85 local | 4 references
86 initChannel: t -> Int -> Int -> Int -> Channel t
87 initChannel d sb se n =
88   2 references
89   let b = Array.repeat n d
90       z = Array.repeat n 0 in
91   Channel b z z z z sb se 0
```

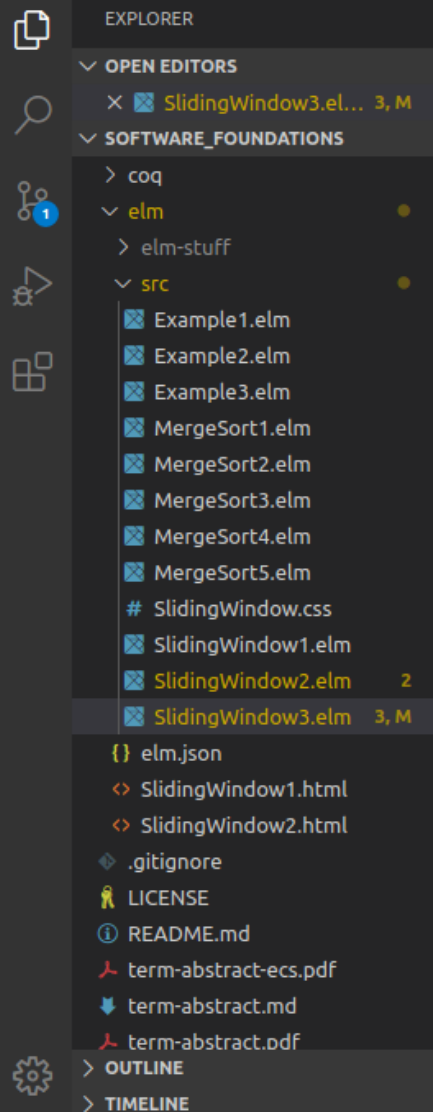
packets

Pw

qw

loss

turn ordering



SlidingWindow3.elm X

elm > src > SlidingWindow3.elm > init > data

```
89
90  -- UPDATE
91  local | 3 references
92  type Msg =
93    SendP Int |
94    SendQ Int |
95    RecvP Int |
96    RecvQ Int |
97    Next Int
98
99  exposed | 10 references
100 update: Msg -> Model -> Model
101 update msg model =
102   let {p, q, pq, qp, t} = model in
103   case msg of
104     SendP i ->
105       let (p1, x) = processSend 0 t i p
106         pq1       = channelRecv t x pq in
107       if processCanSend i p then {model | p = p1, pq = pq1, t = t+1} else {model | t = t+1}
108     SendQ i ->
109       let (q1, x) = processSend 0 t i q
110         qp1       = channelRecv t x qp in
111       if processCanSend i q then {model | q = q1, qp = qp1, t = t+1} else {model | t = t+1}
112     RecvP i ->
113       let (qp1, x) = channelSend 0 t i qp
114         p1        = processRecv t x p in
115       if channelCanSend i qp then {model | p = p1, qp = qp1, t = t+1} else {model | t = t+1}
116     RecvQ i ->
117       let (pq1, x) = channelSend 0 t i pq
118         q1        = processRecv t x q in
119       if channelCanSend i pq then {model | q = q1, pq = pq1, t = t+1} else {model | t = t+1}
120     Next i ->
121       if i == 1 then
```

} interactive actions
automatic action





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 - SlidingWindow1.elm
 - SlidingWindow2.elm 2
 - SlidingWindow3.elm 3, M
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- SlidingWindow1.html
- SlidingWindow2.html
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OUTLINE

TIMELINE

SlidingWindow3.elm X

elm > src > SlidingWindow3.elm > init > data

```
309
310
311
312 -- VIEW
313 view: Model -> Html Msg
314 view model =
315   let {p, q, pq, qp} = model in
316   div [] [
317     node "link" [
318       rel "stylesheet",
319       href "SlidingWindow.css"
320     ] [],
321     table [] [
322       tr [] [
323         td (class "psend" :: styleTurn 0 model) [viewProcess p "P.send" SendP True],
324         td (class "pq" :: styleTurn 1 model) [viewChannel pq "P -> Q" RecvQ],
325         td (class "qrecv" :: styleTurn 4 model) [viewProcess q "Q.recv" Next False]
326       ],
327       tr [] [
328         td (class "precv" :: styleTurn 5 model) [viewProcess p "P.recv" Next False],
329         td (class "qp" :: styleTurn 3 model) [viewChannel qp "Q -> P" RecvP],
330         td (class "qsend" :: styleTurn 2 model) [viewProcess q "Q.send" SendQ True]
331       ]
332     ],
333     div [class "submit"] [
334       viewNext (not (isDone model)),
335       viewController model
336     ]
337   ]
```

viewProcess: Process Int -> String -> (Int -> Msg) -> Bool -> Html Msg

viewProcess p id msg vs =

let {send, recv, st, s, rt, r, mode, t} = p

n = processSize p





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 - Example2.elm
 - Example3.elm
 - MergeSort1.elm
 - MergeSort2.elm
 - MergeSort3.elm
 - MergeSort4.elm
 - MergeSort5.elm
 - # SlidingWindow.css
 - SlidingWindow1.elm
 - SlidingWindow2.elm 2
 - SlidingWindow3.elm 3, M
- elm.json
- SlidingWindow1.html
- SlidingWindow2.html
- .gitignore
- LICENSE
- README.md
- term-abstract-ecs.pdf
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TIMELINE

SlidingWindow3.elm X

elm > src > SlidingWindow3.elm > init > data

```
446     )]
447   ]
448
449   viewNext: Bool -> Html Msg
450   viewNext actv =
451     div [] [
452       button [
453         class "next",
454         disabled (not actv),
455         onClick (Next 1)
456       ] [text "Next"],
457       button [
458         class "next",
459         disabled (not actv),
460         onClick (Next 20)
461       ] [text "Next 20"],
462       button [
463         class "next",
464         disabled (not actv),
465         onClick (Next 100)
466       ] [text "Next 100"]
467     ]
468
469
470
471   -- STYLES
472   styleTurn: Int -> Model -> List (Attribute m)
473   styleTurn i model = [
474     style "background-color" (if whoseTurn model == i then "lightgreen" else "yellow")
475   ]
476
477   stylePacket: Int -> Int -> Bool -> List (Attribute m)
478   stylePacket sent rcvd selc =
```



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 - SlidingWindow1.elm
 - SlidingWindow2.elm 2
 - SlidingWindow3.elm 3, M
- elm.json
- SlidingWindow1.html
- SlidingWindow2.html
- .gitignore
- LICENSE
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- term-abstract-ecs.pdf
- term-abstract.md
- term-abstract.pdf

OUTLINE

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SlidingWindow3.elm X

elm > src > SlidingWindow3.elm > init > data

```
422 | onClick msg
423 |> [text (intStr data)]
424
425 | viewController: Model -> Html Msg
426 | viewController model =
427 |   let {p, t} = model
428 |     |> sent1 = processSent p
429 |     |> sentn = processSentAll p
430 |     |> rcvd1 = processRcvd p
431 |     |> rcvdn = processRcvdAll p
432 |     |> delt = processDeltaT p
433 |     |> latn = processLatencies p
434 |     |> end = isDone model
435 |     |> msg = if end then "All packets recieved." else "Some packets not yet recieved." in
436 |   div [class "controller"] [
437 |     div [] [text ("Controller (" ++ intStr t ++ ")")],
438 |     div [class "status" :: styleStatus end] [text msg],
439 |     div [] [text (
440 |       "Txfr: " ++ intStr rcvd1 ++ "/" ++ intStr sent1 ++ " (" ++ perStr rcvd1 sent1 ++ "), " ++
441 |       "Effc: " ++ intStr rcvd1 ++ "/" ++ intStr sentn ++ " (" ++ perStr rcvd1 sentn ++ ")")
442 |     ],
443 |     div [] [text (
444 |       "Thpt: " ++ wrtStr 2 rcvd1 delt ++ "/" ++ wrtStr 2 rcvdn delt ++ " (" ++ intStr delt ++ "), "
445 |       "Latn: " ++ wrtStr 2 (arraySum latn) rcvd1 ++ " (" ++ intStr (arraySum latn) ++ ")")
446 |     ]
447 |   ]
```


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 - Example3.elm
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 - MergeSort2.elm
 - MergeSort3.elm
 - MergeSort4.elm
 - MergeSort5.elm
 - # SlidingWindow.css
 - SlidingWindow1.elm
 - SlidingWindow2.elm 2
 - SlidingWindow3.elm 3, M
- elm.json
- SlidingWindow1.html
- SlidingWindow2.html
- .gitignore
- LICENSE
- README.md
- term-abstract-ecs.pdf
- term-abstract.md
- term-abstract.pdf

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```
407 | "Effc: " ++ intStr sent1 ++ "/" ++ intStr rcvdn ++ " (" ++ perStr sent1 rcvdn ++ ")"
408 | ],
409 | div [] [text (
410 |   "Thpt: " ++ wrtStr 2 sent1 delt ++ "/" ++ wrtStr 2 sentn delt ++ " (" ++ intStr delt ++ "), "
411 |   "Latn: " ++ wrtStr 2 (arraySum latn) sent1 ++ " (" ++ intStr (arraySum latn) ++ ")")
412 | ])
413 | ]
414 |
415 | viewPacket: Int -> Int -> Int -> Int -> Int -> Bool -> Bool -> msg -> Html msg
416 | viewPacket data strn sent rtn rcvd selc actv msg =
417 |   button (class "packet" :: stylePacket sent rcvd selc ++ [
418 |     title (
419 |       "Sent: " ++ intStr sent ++ " [" ++ intStr strn ++ "], " ++
420 |       "Rcvd: " ++ intStr rcvd ++ " [" ++ intStr rtn ++ "])",
421 |     disabled (not actv),
422 |     onClick msg
423 |   ]) [text (intStr data)]
424 |
425 | viewController: Model -> Html Msg
426 | viewController model =
427 |   let {p, t} = model
428 |       | sent1 = processSent p
429 |       | sentn = processSentAll p
430 |       | rcvd1 = processRcvd p
431 |       | rcvdn = processRcvdAll p
432 |       | delt = processDeltaT p
433 |       | latn = processLatencies p
```

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- SlidingWindow1.html
- SlidingWindow2.html
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- LICENSE
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- term-abstract-ecs.pdf
- term-abstract.md
- term-abstract.pdf

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elm > src > SlidingWindow3.elm > init > data

```
392 | rcvd i = arrayGet 0 i r
    | 7 references
393 | actv i = channelCanSend i c
    | 1 reference
394 | msgi i = msg i
    | 2 references
395 | vpkt i = viewPacket (data i) (strn i) (sent i) (rtrn i) (rcvd i) (k==i) (actv i) (msgi i)
    | 9 references
396 | sent1 = channelSent c
    | 4 references
397 | sentn = channelSentAll c
    | 9 references
398 | rcvd1 = channelRcvd c
    | 4 references
399 | rcvdn = channelRcvdAll c
    | 7 references
400 | delt = channelDeltaT c
    | 5 references
401 | latn = channelLatencies c in
402 | div [] [
403 |   text ("Channel: " ++ id ++ " (" ++ intStr t ++ ")"),
404 |   div [] (map vpkt (range 0 (n-1))),
405 |   div [] [text (
406 |     "Txfr: " ++ intStr sent1 ++ "/" ++ intStr rcvd1 ++ " (" ++ perStr sent1 rcvd1 ++ "), " ++
407 |     "Effc: " ++ intStr sent1 ++ "/" ++ intStr rcvdn ++ " (" ++ perStr sent1 rcvdn ++ ")")
408 | ],
409 |   div [] [text (
410 |     "Thpt: " ++ wrtStr 2 sent1 delt ++ "/" ++ wrtStr 2 sentn delt ++ " (" ++ intStr delt ++ "), "
411 |     "Latn: " ++ wrtStr 2 (arraySum latn) sent1 ++ " (" ++ intStr (arraySum latn) ++ ")")
412 | ])
413 | ]
414 |
415 | viewPacket: Int -> Int -> Int -> Int -> Int -> Bool -> Bool -> msg -> Html msg
```

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 - SlidingWindow1.elm
 - SlidingWindow2.elm 2
 - SlidingWindow3.elm 3, M
- elm.json
- SlidingWindow1.html
- SlidingWindow2.html
- .gitignore
- LICENSE
- README.md
- term-abstract-ecs.pdf
- term-abstract.md
- term-abstract.pdf

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352 msgi i = if vs then msg i else Next i
353 vpkt i = viewPacket (data i) (strn i) (sent i) (rtrn i) (rcvd i) (k==i) (actv i) (msgi i)
354 sent1 = processSent p
355 sentn = processSentAll p
356 sdelt = arrayMax st - arrayMin st
357 slatn = processSentLatencies p
358 rcvd1 = processRcvd p
359 rcvdn = processRcvdAll p
360 rdelt = arrayMax rt - arrayMin rt
361 rlatn = processRcvdLatencies p in
362 div [] [
363   text ("Process: " ++ id ++ " [" ++ mode ++ "] " ++ if vs then " (" ++ intStr t ++ ") " else ""),
364   div [] (map vpkt (range 0 (n-1))),
365   if vs then div [] [text (
366     "Sent: " ++ intStr sent1 ++ "/" ++ intStr n ++ " (" ++ perStr sent1 n ++ "), " ++
367     "Effc: " ++ intStr sent1 ++ "/" ++ intStr sentn ++ " (" ++ perStr sent1 sentn ++ ")")
368   ]
369   else div [] [text (
370     "Rcvd: " ++ intStr rcvd1 ++ "/" ++ intStr n ++ " (" ++ perStr rcvd1 n ++ "), " ++
371     "Effc: " ++ intStr rcvd1 ++ "/" ++ intStr rcvdn ++ " (" ++ perStr rcvd1 rcvdn ++ ")")
372   ]),
373   if vs then div [] [text (
374     "Thpt: " ++ wrtStr 2 sent1 sdelt ++ "/" ++ wrtStr 2 sentn sdelt ++ " (" ++ intStr sdelt ++ ") "
375     "Latn: " ++ wrtStr 2 (arraySum slatn) sent1 ++ " (" ++ intStr (arraySum slatn) ++ ")")
376   ]
377   else div [] [text (
378     "Thpt: " ++ wrtStr 2 rcvd1 rdelt ++ "/" ++ wrtStr 2 rcvdn rdelt ++ " (" ++ intStr rdelt ++ ") "
379     "Latn: " ++ wrtStr 2 (arraySum rlatn) sent1 ++ " (" ++ intStr (arraySum rlatn) ++ ")")
380   ]
381 ]
382
383 viewChannel: Channel Int -> String -> (Int -> Msg) -> Html Msg
384 viewChannel c id msg =
```