

Concurrency Quiz: SCOOP

First name, last name:

Background information

In this part of the quiz, we would like to collect some information concerning your prior experience with concurrent programming.

What level of studies are you currently completing?

- Bachelor in Computer Science
- Master in Computer Science
- PhD in Computer Science

Other:

Which semester are you currently completing? (e.g. 4th)

Prior experience with concurrency

Have you ever taken or are you currently taking a course other than Software Architecture that covers concurrent programming?

- Yes
- No
- No, but I studied it on my own (e.g. through online tutorials, books, ...)

If yes, what course was/is it and when did you take it? (Please provide details below.)

- Parallel programming @ ETH Zurich by T. Gross in Spring
- Concepts of concurrent computation @ ETH Zurich by B. Meyer in Spring
- Other courses:

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How much of the self-study material on concurrency that you worked with today did you already know before?

- none
- 10%
- 20%
- 30%
- 40%
- 50%
- 60%
- 70%
- 80%
- 90%
- all

Programming experience (sequential and concurrent)

	(1: a novice ... 5: an expert)
Concerning your general programming experience , do you consider yourself...	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Concerning your experience with concurrent programming , do you consider yourself...	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Concerning your experience with the programming language Eiffel , do you consider yourself...	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Concerning your experience with the programming language Java , do you consider yourself...	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Concerning your experience with Java Threads , do you consider yourself...	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Concerning your experience with SCOOP , do you consider yourself...	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Self-study material

Where did you work through the self-study material?

- In the morning lecture In the exercise class At home

	(1: totally disagree ... 5: totally agree)
The self-study material was easy to follow.	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
The self-study material provided enough examples to help me understand the subject.	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
The self-study material provided enough exercises to help me understand the subject.	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
I was able to complete the tutorial within 90 minutes.	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
The self-study material is a good alternative to the traditional lectures.	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
I feel confident that I will be able to solve the tasks in this quiz.	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Any comments on the self-study material:

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1 Sequential comprehension

Write down the output of the sequential Eiffel program shown below.

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<pre> class APPLICATION create make feature a: A b: B c: C make do create a; create b; create c; print ("A") run (a, b) print ("L") end run (aa: A; bb: B) do aa.m(c) bb.n(c) if (aa.done_a and bb .done_b) then print ("M") end end end </pre>	<pre> class A feature done_a: BOOLEAN m (cc: C) do cc.f done_a := true end end </pre>	<pre> class B feature done_b: BOOLEAN n(cc: C) do cc.g done_b := true print ("T") end end </pre>
	<pre> class C feature done_c: BOOLEAN f do print("F") done_c := false end g do print("S") done_c := true end end </pre>	

2 General concurrency concepts

What is multiprocessing?

- Execution of multiple processes, within a single computer sharing a single processing unit.
- Execution of a single process on a single computer.
- Execution of a single process within multiple computers.
- Execution of multiple processes within a single computer sharing two or more processing units.

Which of the following state transitions is not possible in the status of a process?

- running \rightarrow ready
- ready \rightarrow blocked
- blocked \rightarrow ready
- running \rightarrow blocked

In the space below explain the terms data race and mutual exclusion.

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What is a deadlock?

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3 Comprehension

Write down three possible (non-deadlock) outputs for the SCOOP program shown below:

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<pre> class APPLICATION create make feature a: separate A b: separate B c: separate C d: D make do create a; create b; create c; create d; print ("A") run (a, b) print ("L") end run (aa: separate A; bb: separate B) do aa.m (c) bb.n (c) aa.m (c) bb.n (c) d.foo if (aa.done_a and bb.done_b) then print ("M") end end end </pre>	<pre> class A feature done_a: BOOLEAN m (cc: separate C) require cc.done_c do cc.f done_a := true end end </pre>	<pre> class B feature done_b: BOOLEAN n(cc: separate C) require not cc.done_c do print ("T") cc.g done_b := true end end </pre>
	<pre> class C feature done_c: BOOLEAN f do print("F") done_c := false end g do print("S") done_c := true end end </pre>	<pre> class D feature foo do print("P") end end </pre>

4 Errors

Identify errors (possibly compile-time) in the following SCOOP code segment. Justify your answers by providing on the next page the line number and a short explanation for every detected error. (The number of provided spaces does not necessarily correspond to the actual number of errors.)

```
1 class A create make
2 feature
3   b: separate B
4   c: C
5
6   make
7     local
8       b1: B;
9     do
10      create b; create c;
11      b1 := g
12    end
13
14  f(b1: separate B): B
15    local
16      b2: B
17      c1: separate C
18    do
19      b2 := b
20      c1 := c
21      b.f
22      c.g
23      Result := b1.h
24    end
25
26  g: separate B
27    local
28      b1: B
29    do
30      h(b)
31      create b1
32      Result := b1
33    end
34
35  h(b1: B)
36    local
37      b2: separate B
38      c1: C
39      i: INTEGER
40    do
41      create b2
42      i := c.r
43      c1 := b2.h.r
44    end
45 end
```

```
46 class B
47
48 feature
49
50   r: C
51
52   h: B
53
54   f
55   do
56     create h
57     create r
58   end
59 end
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60 class C
61
62 feature
63
64   r: INTEGER
65
66   g
67   do
68     r := 10
69   end
70 end
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Line number	Explanation
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Feedback on the quiz

How much time did you spend on this quiz?

20'	30'	40'	50'	60'	70'	80'	90'	100'	110'	120'
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The difficulty level of the quiz was... (1: too easy, 2: easy, 3: just right, 4: difficult, 5: too difficult)	1	2	3	4	5
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel confident that I solved the tasks of this quiz correctly. (1: totally disagree ... 5: totally agree)	1	2	3	4	5
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Did you leave any questions of the quiz empty and if so, why?

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Any comments on the quiz:

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