Enrolment Number:	
Enrolment Number:	

The University of Melbourne School of Computing and Information Systems

Semester 2, 2018 Sample Final Exam

COMP90041 Programming and Software Development

Reading Time: 15 minutes Total marks for this paper: 51

Writing Time: 2 hours This paper has 21 pages.

Authorised Materials:

Writing instruments (e.g., pens, pencils, erasers, rulers). No other materials and no electronic devices are permitted.

Instructions to Invigilators:

Students will write their answers in the exam paper itself.

The exam paper must remain in the exam room and be returned to the subject coordinator.

Instructions to Students:

Write your enrolment (student) number in the box above. Answer questions directly on this exam paper in the box(es) provided. Use the flip sides of pages for rough work. The last 2 pages are provided in case you need more space for any answers. If you use this overflow space, put a note where the answer belongs saying where the rest of the answer is.

The marks for each question are listed at the beginning of the question. You should attempt all questions. Use the number of marks allocated to a question as a rough indication of the time to spend on it. We have tried to provide ample space for your answers; do not take the amount of space provided for an answer as an indication of how much you need to write.

This paper must *not* be lodged with the university library.

Examiners' use:

1	2	3	4	5	6	7	8	9	Total

Question 1 [6 marks]

Consider a method whose definition is the following:

```
static String testmethod(int n)
{
    String r = "none";
    switch (n)
    {
       case 1: r = "one";
       case 2: r = "two";
       case 3: r = "three";
    }
    return r;
}
```

What string is returned by each of the following calls?

(a)	testmethod(1)
(b)	testmethod(2)
(c)	testmethod(8)

Question 2

[6 marks]

There are some actions that the implementations of stationary implementations of non-static methods can perform.	Give an example, and give the reason
why Java does not allow static methods to perform that	at action.

[6 marks]

Question 3

s of Java 1.5, ow is this an enerics?	Java support improvement	s generic ty on the Arr	rpes, for exa rayList cla	mple Array ss of Java 1	List. Wha .4, when Ja	t is a generic ty va did not sup

Question 4		[3 marks]
What will this	s code fragment print?	
	<pre>int x=3, y=0; while (x>=0) { y++; x; } System.out.println(y);</pre>	
Question 5		[3 marks]
What will this	s code fragment print?	
	<pre>int[] a = {1,1,2}; int sum = 0; for (int i=1; i<=3; ++i) { sum += a[i]; } System.out.println(sum);</pre>	

[6 marks]

Question 6

A privacy leak in a Java program occurs when a class's internal data can be manipulated by methods of other classes, despite being declared private. List at least two ways this can happen, and give an example. List as many ways as you can think of for the author of the class to prevent privacy leaks.

Question 7

[6 marks]

The println m f which primi ccomplish this	tive type or	class it bel	ongs to.	Outline the	e mechanis	m that prin	ntln uses to
	y casii.						

[(marks]

Question 8

Question 9 [15 marks]

Write two classes, Position and Displacement. A Position represents a Cartesian (x,y) position pair, and a Displacement represents a Cartesian distance, that is, a $(\delta x, \delta y)$ pair. Ensure that both classes are **immutable**. In both cases, values should be represented as doubles.

These classes should implement the following operations:

- Construct new Position and Displacement objects;
- Subtract one Position from another to get a Displacement;
- Add a Displacement to a Position to get a Position;
- Add two Displacements to get a Displacement;
- Scale (multiply) a Displacement by a scalar (double);
- Get the x and y components of both Positions and Displacements.

Please write your answer on pages 10-16.

Answer to Question 9

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Answer to Question 9 (continued)

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Answer to Question 9 (continued)

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Answer to Question 9 (continued)

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Overflow Answer Page 1

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COMP90041 Programming and SD

Overflow Answer Page 2

You may use this space to continue any answer, but if you do, indicate *clearly* in your previous answer that you have continued onto this page, or this part of your answer may be overlooked.

— End of Exam —