

APOLLO

B1 Computational thinking SL

Computer Science
First assessment 2027
2 questions | mark schemes

1. (a) *Award [1 max]*

because it is in diagrammatic form;
 it is program agnostic;
 no complicated code / syntax to follow;

(b) *Award [3]*

correct values of i;
correct values of j;
correct output;

i	i <= N ?	j	j <= N ?	output
1	TRUE			1
		2	TRUE	2
		3	TRUE	3
		4	FALSE	
2	TRUE			2
		3	TRUE	3
		4	FALSE	
3	TRUE	4	FALSE	3
4	FALSE			

(c) *Award [1]. Note: the algorithm shows a nested loop.*

$O(n^2)$;

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(d) Award **[5 max]** as follows

opening *employees* file for reading / default mode;
open *surnames* file for writing;
looping through *employees* file;
use of a counter or equivalent;
writing surnames only to *surnames* file;
closing both files;

*Note: Award **[1]** for first 2 marking points if files are opened without indicating access modes.*

Algorithm is:

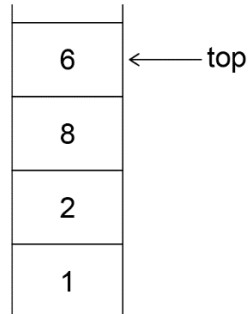
```
open employees file for reading / in default mode
open surnames file for writing
set counter to 0
repeat until end of employees file
    read next line from employees file
    if counter%3 = 0 *
        write line to surnames file
    increment counter
close both files
```

* there are alternatives ways of using counter

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(e) *Award [2].*

correct elements in stack **[1]**;
correct indication of top **[1]**;



(f) *Award [3] as follows:*

Award [1] for each correct line (or equivalent).

repeat until isEmpty is true / while isEmpty is false;

pop an element and save its value/save in a variable/push it onto a new stack (stack2)

print the last value saved/print the variable/pop stack2 and print value

Note: Answer must demonstrate an algorithmic approach.

4. (a) Award [1 max]

because it is in diagrammatic form;
 it is program agnostic;
 no complicated code / syntax to follow;

(b) Award [3]

correct values of i;
correct values j;
correct output;

i	i < = N ?	j	j < = N ?	output
1	TRUE			1
		2	TRUE	2
		3	TRUE	3
		4	FALSE	
2	TRUE			2
		3	TRUE	3
		4	FALSE	
3	TRUE	4	FALSE	3
4	FALSE			

(c) Award [1]. Note: the algorithm shows a nested loop.

$O(n^2)$;

(d) Award **[5 max]** as follows

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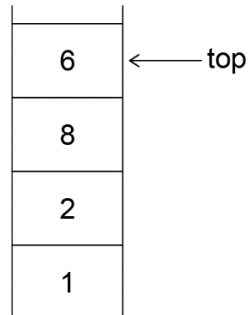
* there are alternatives ways of using counter

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(e) *Award [2].*

correct elements in stack **[1]**;

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(f) *Award [3] as follows:*

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Note: Answer must demonstrate an algorithmic approach.