Last name	
First name	
Group	

Grade	
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Algorithmics
Undergraduate 1^{st} year S1
Final Exam #1 (P1)
8 Jan. 2019 - 10:00
Answer Sheets

1	
2	
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5	
6	

Answers 1 (Binary Search: search "path" – 2 points)

Valid search sequences?

- 50 15 48 22 46 42
- YES NO
- 48 15 45 22 47 42
- YES NO
- 15 22 45 43 35 42
- YES NO
- 22 45 43 15 35 42
- YES NO

Answers 2 (Searching algorithms – 3 points)

- 1. Linear search regardless of element order:
- 2. Linear search taking into account the element order:

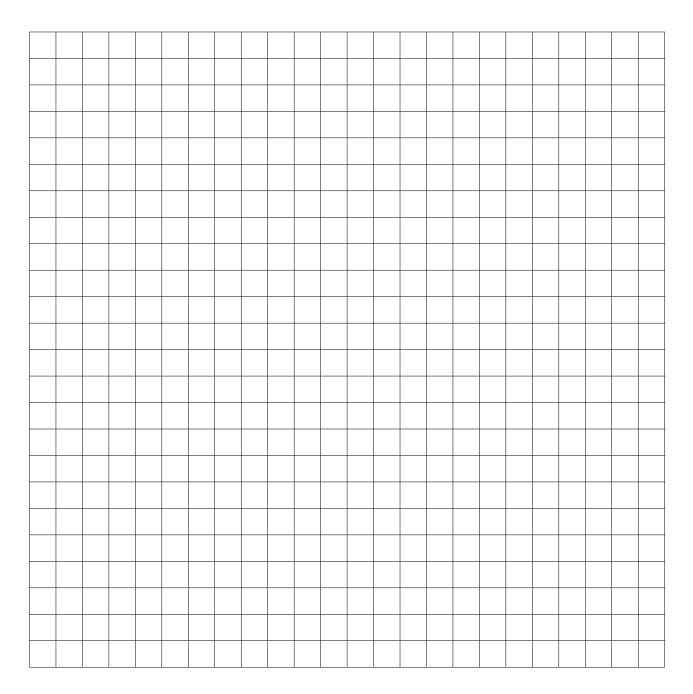


3. Binary search:

Answers 3 (See Syracuse -3 points)

Specifications:

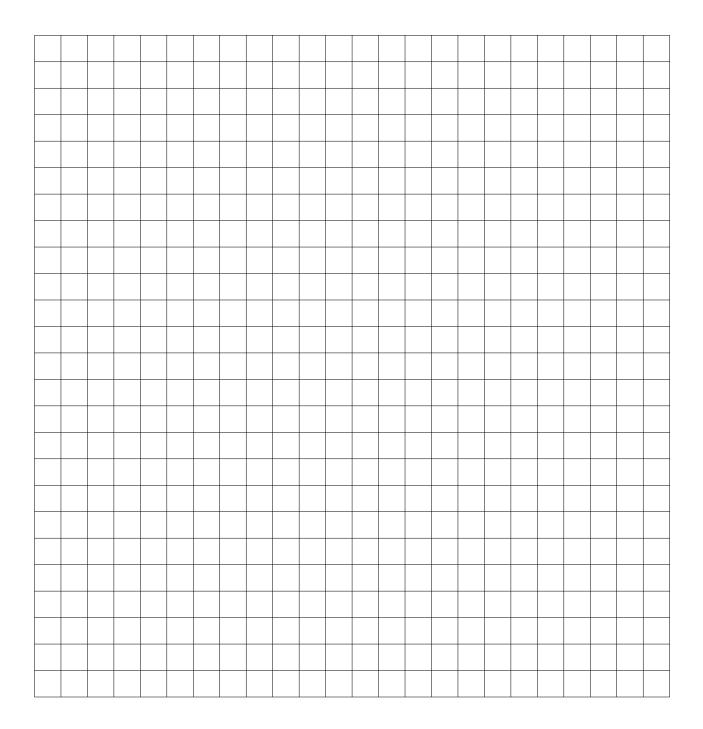
The function syracuse(n) builds the list L of all the Syracuse sequence numbers from n if $n \ge 1$. Otherwise, it returns an empty list.



Answers 4 (Arithmetic progression – 4 points)

Specifications:

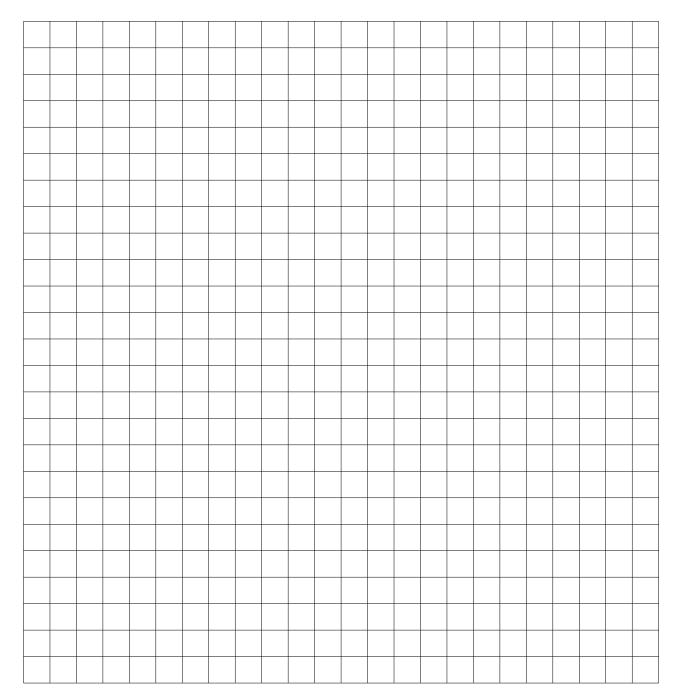
The function arithmetic(L) tests whether the list L has at least two elements and follows an arithmetic progression. In this case, it returns the common difference, otherwise it returns 0.



Answers 5 (Deletion in sorted list – 5 points)

Specifications:

The function delete(L, x) removes the value x, if it exists, from the list L sorted in strictly increasing order and returns a boolean that indicates whether the deletion occurred.



Answers 6 (What is it? - 3 points)

1. Result of the following application of what:

1	>>> what([1,3,2,8,7,2,5,4,0,6,2,15])
2	
3	

2. We call what(L) with L a list of natural numbers.

(a)	At the end of the first loop, what does me represent?
(b)	At the end of the third loop, what does ${\tt X}$ represent?
(c)	What does this function returns?

3. Bonus: What is the complexity of this function?