Mock exam

Due Oct 22 at 9am **Points** 21 **Questions** 13
Available Oct 22 at 9am - Oct 25 at 11:59pm 4 days **Time Limit** None

Instructions

Mock Exam Computational Thinking
(Note: the exam can be opened only one time !)

Date: 22 October 2018

Time: 2.5 hours

Remarks

- Read the questions carefully and check what is being asked before you answer them!
- You are not allowed to use such devices as calculator, laptop, mobile, or similar.
- Do not guess. Make the questions on paper first. That way you will increase the chance of a good answer.

This quiz was locked Oct 25 at 11:59pm.

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	5,199 minutes	0 out of 21

Score for this quiz: **0** out of 21
Submitted Oct 26 at 12:59am
This attempt took 5,199 minutes.

Unanswered

Question 1 — 0 / 1 pts

What is an Eulerian graph?

- An Eulerian graph is a *connected graph* in which all edges have a direction towards a vertice.
- An Eulerian graph is a *two component graph* in which you can make a walk, in which *all edges* occur exactly once.

An Eulerian graph is a *complete graph* in which you can walk all edges twice.

An Eulerian graph is a *complete graph* in which all vertices are connected with each other.

An Eulerian graph is a *two component graph* in which you can make a walk, in which *all vertices* occur exactly once.

orrect Answer

An Eulerian graph is a *connected graph* in which you can make a walk, in which *all edges* occur exactly once.

An Eulerian graph is a *connected graph* in which you can make a walk, in which *all vertices* occur exactly once.

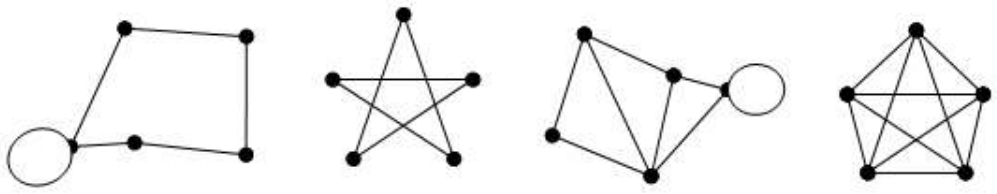
An Euler graph is a *connected graph* in which you can make a walk, in which *all edges* occur exactly once.

Unanswered

Question 2

0 / 3 pts

Which of the following graphs contain an Eulerian cycle?



A B C D

orrect Answer

D

orrect Answer

A

orrect Answer

B

C

None of the graphs contain an Euler-Cykel.

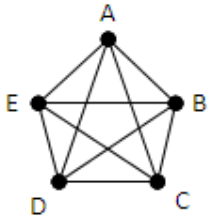
A, B, and D contain an Euler-Cykel.

Unanswered

Question 3

0 / 2 pts

Find two Hamilton circuits in the graph below.



- A-B-C-D-E
- A-D-B-E-A
- A-B-A-E-D-C-B
- A-B-C-E-A

orrect Answer

- A-B-C-D-E-A

- A-C-E-B-D
- A-B-C-E
- A-D-B-E

orrect Answer

- A-C-E-B-D-A

For example, A-B-C-D-E-A and A-C-E-B-D-A are a Hamilton circuit in the graph.

Unanswered

Question 4

0 / 1 pts

Suppose that there is a global network of one hundred airports and that between each pair of airports there is a direct connection. In connection with the cuts, the governments of various countries want to eliminate connections as far as possible. It must, however, still be possible to travel from one airport to another one, where appropriate after transfer.

How many connections can you eliminate if you do *not* take into account the maximum number of times to transfer?

- 2424
- 100!-99!
- 2475
- 49

orrect Answer

- 4851
- 4850
- 99
- 2425
- 99!
- 50

Initially you have 4950 $\left(= \frac{n(n-1)}{2} \right)$ connections. If you connect all airports along a line then you need only 99 connections. So, you can eliminate 4851 connections.

Unanswered

Question 5

0 / 1 pts

Suppose that there is a global network of one hundred airports, and that between each pair of airports there is a direct connection. In connection with the cuts the governments of various countries want to eliminate connections as far as possible. It must, however, still be possible to travel from one airport to another one, where appropriate after transfer.

How many connections do you need if you want to transfer *only one time*?

orrect Answer

- [x] 99
- [ ] 2424
- [ ] 50
- [ ] 99!
- [ ] 49
- [ ] 100!-99!
- [ ] 4851
- [ ] 2425
- [ ] 4850
- [ ] 2475

You need 99 connections if you place one airport in the centre and all the others connected with this airport.

Unanswered

Question 6

0 / 1 pts

4	13	25	33	38	41	55	71	73	84	86	92	97

In the above sequence we are searching for the number 25 with *binary search* and *linear search*.
Which of the following statements is true?

orrect Answer

- Linear search in this case is faster than binary search.
- Linear search and binary search in this case are equally fast.
- Binary search in this case is faster than linear search.

Linear search in this case is faster than binary search.

Unanswered

Question 7

0 / 1 pts

4	13	25	33	38	41	55	71	73	84	86	92	97

What is the *minimum* number of comparisons needed to search number 25 in the above sequence for binary search?

- 12
- 11
- 10
- 3
- 6
- 9
- 7
- 5
- 8

orrect Answer

- 4

You need minimal 4 comparisons to search for number 25 with binary search in the given sequence.

Unanswered

Question 8

0 / 2 pts

3	9	6	7	5	4	1	8	2	10

The above sequence is sorted with quicksort. Select **two** of the following stages involved in sorting of the above sequence.

Note: The underlined digit/number is the pivot.

- [ ] 3^i - 9 - 6^j
- [ ] 3^i - 7 - 2 - 8^j
- [ ] 1 - 3 - 7^i - 5 - 4 - 6 - 8^j - 2 - 9 - 10
- [ ] 3 - 2 -1 -7^i - 5 - 4^j - 6 - 8 - 9 - 10

orrect Answer

- [ ] 1 - 2 -3 -7^i - 5 - 4 - 6 - 8^j - 9 - 10
- [ ] 1 - 2 -3 -7^i - 5 - 4^j - 6 - 8 - 9 - 10
- [ ] 3^i - 2 - 1^j

orrect Answer

The stages 3^i - 2 - 1^j and 3 - 2 -1 -7^i - 5 - 4^j - 6 - 8 - 9 - 10 are involved in sorting the sequence.

Unanswered

Question 9

0 / 4 pts

	A	B	C	D	E	F	G
A	-	8	-	9	-	-	-
B	8	-	5	-	5	7	8
C	-	5	-	6	3	3	-
D	9	-	6	-	10	-	-
E	-	5	3	10	-	6	11
F	-	7	3	-	6	-	4
G	-	8	-	-	11	4	-

Select **four** properties of the graph that is represented by the distance table.

orrect Answer
- [x] A weighted graph.
- [ ] A directed graph.
- [ ] A graph with two components.
- [ ] A mixed graph.

orrect Answer
- [x] A connected graph.

orrect Answer
- [x] A graph with a Hamilton cykel.
- [ ] A graph with an Euler cykel.

orrect Answer
- [x] An undirected graph.
- [ ] A complete graph.
- [ ] A graph that is not connected.

The four properties of the graph are:
1. A connected graph.
2. An undirected graph.
3. A weighted graph.
4. A graph with a Hamilton cykel.

Unanswered

Question 10

0 / 2 pts

	A	B	C	D	E	F	G
A	-	6	5	7	-	-	-
B	6	-	3	-	3	5	6
C	5	3	-	4	1	-	-
D	7	-	4	-	8	-	-
E	-	3	1	8	-	4	9
F	-	5	-	-	4	-	2
G	-	6	-	-	9	2	-

Determine, using Dijkstra's algorithm, the **two** shortest paths from A to G.

- [ ] A-D-C-E-G
- [ ] A-B-F-G

orrect Answer

- [x] A-C-E-F-G
- [ ] A-D-E-G
- [ ] A-B-E-G
- [ ] A-C-B-E-F-G

orrect Answer

- [x] A-B-G
- [ ] A-C-E-B-F-G
- [ ] A-C-B-G
- [ ] A-B-C-E-G

The two shortest paths are: A-B-G and A-C-E-F-G
Both paths are 12.

Unanswered

Question 11

0 / 1 pts

	A	B	C	D	E	F	G
A	-	12	-	14	-	-	-
B	12	-	6	-	-	10	12
C	-	6	-	8	2	-	-
D	14	-	8	-	16	-	-
E	-	-	2	16	-	8	18
F	-	10	-	-	8	-	4
G	-	12	-	-	18	4	-

Determine the weight of the minimum spanning tree for the graph which is represented by the distance table.

- 42
- 66

orrect Answer

- 40
- 36
- 50
- 38
- 64
- 52
- 46
- 48

The weight of the minimum spanning tree for the graph is 40.

Unanswered

Question 12

0 / 1 pts

Two cows stand 100 meters from each other. A fly is sitting on the nose of one of the cows. At a certain moment, the cows start walking toward each

other at a speed of 4 km per hour. At that same moment, the fly flies at a speed of 50 km per hour. He flies from the nose from one cow to another cow and then back again. He keeps doing this until the cows have reached each other.

What is the total distance in meters that the fly has traveled?

- 12.5
- 100
- 50
- 625 (orrect Answer)
- 475
- 42.5
- 425
- 62.5
- 75
- 125

The cows take 50/4000 hours to travel 50 meters.
The fly travels then 50000 x (50/4000) = 625 meters.

Jnanswered

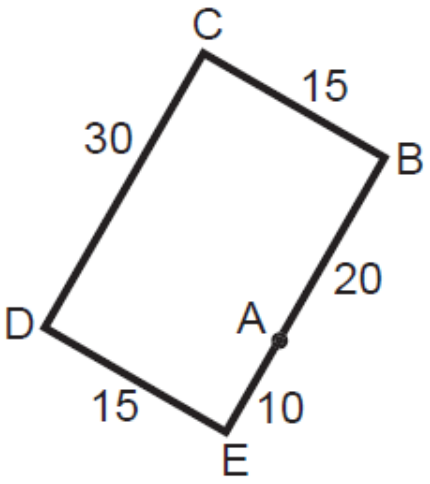
Question 13

0 / 1 pts

John lives in Gluckstadt and he gets offered a job in Jackson. Before he accepts the job he wants to know how far it is to drive from Gluckstadt to Jackson. He has the following details of his future employer.

Gluckstadt is located 20 km south-southwest of Nashville. From Nashville to Springfield you have to drive 15 km to the west-northwest direction. Springfield is located 30 km north-northeast of Little Rock. Jackson is located 15 km east-southeast of Little Rock.

To calculate the distance between Gluckstadt and Jackson, he translated the text into a map.



where

A = Gluckstadt
B = Nashville
C = Springfield
D = Little Rock
E = Jackson

Which solution strategy is used by John to calculate the distance between Gluckstadt and Jackson?

- Explore all possibilities
- Dijkstra's algorithm
- Divide and conquer
- Shortest paths
- Guess and check
- Use formulas/equations
- Prim's algorithm
- Discover a structure or pattern
- Divide the problem into several subproblems or steps

orrect Answer

- Modeling

John uses modeling as a solution strategy.