CS 341 - Clicker Questions

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CQ 1: I brought my iClicker today.

A True.

B False.

C I am not sure.

CQ 2: My favourite subject in mathematics is:

A Computer Science.

B Algebra.

C Geometry.

D Combinatorics.

E Statistics.

CQ 3: $2^{n-1} \in \Theta(2^n)$.

A True.

B False.

C Not enough information to determine.

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A True.

B False.

C Not enough information to determine.

Ans: A

CQ 4: $(n-1)! \in \Theta(n!)$.

A True.

B False.

C Not enough information to determine.

CQ 4: $(n-1)! \in \Theta(n!)$.

A True.

B False.

C Not enough information to determine.

Ans: B

CQ 5: Let $T(n) = 2T\left(\frac{n}{2}\right) + n$, $T(1) = 0$, n a power of 2.
Then $T(n) \in$:

- A $\Theta(1)$
- B $\Theta(\log n)$
- C $\Theta(n)$
- D $\Theta(n \log n)$
- E $\Theta(n^2)$

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- A $\Theta(1)$
- B $\Theta(\log n)$
- C $\Theta(n)$
- D $\Theta(n \log n)$
- E $\Theta(n^2)$

Ans: D

CQ 6: Let $A = [1, 6, 4, 3, 5, 2, 7, 8]$. Then c_ℓ equals:

A 1.

B 2.

C 3.

D 4.

E None of these.

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A 1.

B 2.

C 3.

D 4.

E None of these.

Ans: B(2) - $(2, 3), (2, 4)$

CQ 7: Let $A = [1, 6, 4, 3, 5, 2, 7, 8]$. Then c_r equals:

A 1.

B 2.

C 3.

D 4.

E None of these.

CQ 7: Let $A = [1, 6, 4, 3, 5, 2, 7, 8]$. Then c_r equals:

A 1.

B 2.

C 3.

D 4.

E None of these.

Ans: A(1) - $(5, 6)$

CQ 8: Let $A = [1, 6, 4, 3, 5, 2, 7, 8]$. Then c_t equals:

A 1.

B 2.

C 3.

D 4.

E None of these.

CQ 8: Let $A = [1, 6, 4, 3, 5, 2, 7, 8]$. Then c_t equals:

- A 1.
- B 2.
- C 3.
- D 4.
- E None of these.

Ans: D(4) - $(2, 5), (2, 6), (3, 6), (4, 6)$

CQ 9: Computing the minimum distance between a pair of points is useful in the context of

A autononmous automobiles.

B air traffic control.

C harbour control.

D all of A–C.

E none of A–C.

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- A autononmous automobiles.
- B air traffic control.
- C harbour control.
- D all of A–C.
- E none of A–C.

Ans: D

CQ 10: Computing the median of a list of numbers is useful in the context of

- A real estate: determining typical property prices.
- B public health: assessing median survival times.
- C quicksort: selecting a pivot.
- D all of A–C.
- E none of A–C.

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- A real estate: determining typical property prices.
- B public health: assessing median survival times.
- C quicksort: selecting a pivot.
- D all of A–C.
- E none of A–C.

Ans: D

CQ 11: Assume that $a, b, c \in \mathbb{R}$ are all strictly positive. Then

A $\frac{a}{b} < \frac{a}{b+c}$

B $\frac{a}{b} = \frac{a}{b+c}$

C $\frac{a}{b} > \frac{a}{b+c}$

D None of A–C.

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C $\frac{a}{b} > \frac{a}{b+c}$

D None of A–C.

Ans: C

CQ 12: Assume that $a, b, c \in \mathbb{R}$ are all strictly positive. Then

A $\frac{a}{b} < \frac{a+c}{b}$

B $\frac{a}{b} = \frac{a+c}{b}$

C $\frac{a}{b} > \frac{a+c}{b}$

D None of A–C.

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D None of A–C.

Ans: A

CQ 13: Assume that $a, b, c \in \mathbb{R}$ are all strictly positive and $b > c$. Then

- A $\frac{a}{b} < \frac{a}{b-c}$
- B $\frac{a}{b} = \frac{a}{b-c}$
- C $\frac{a}{b} > \frac{a}{b-c}$
- D None of A–C.

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- B $\frac{a}{b} = \frac{a}{b-c}$
- C $\frac{a}{b} > \frac{a}{b-c}$
- D None of A–C.

Ans: A

CQ 14: Assume that $a, b, c \in \mathbb{R}$ are all strictly positive and $a > c$. Then

A $\frac{a}{b} < \frac{a-c}{b}$

B $\frac{a}{b} = \frac{a-c}{b}$

C $\frac{a}{b} > \frac{a-c}{b}$

D None of A–C.

CQ 14: Assume that $a, b, c \in \mathbb{R}$ are all strictly positive and $a > c$. Then

A $\frac{a}{b} < \frac{a-c}{b}$

B $\frac{a}{b} = \frac{a-c}{b}$

C $\frac{a}{b} > \frac{a-c}{b}$

D None of A–C.

Ans: C

CQ 15 Setup: Six Degrees of Separation conjectures that any two people on earth are have at most six degrees of separation between them.

1. People you know personally are at 1 degree of separation from you.
2. People whom you don't know personally, but know someone whom you know personally, are at 2 degrees of separation from you.
3. And so on.

CQ 15: The preferred way to discover the number of degrees of separation between you and a randomly chosen person (call them Bob), is:

A
1. Ask each of your friends to discover whether Bob is at degree 1 of separation from them.
2. If not, then ask each of your friends to discover whether Bob is at degree 2 of separation from them.
3. And so on.

B
1. Discover all people at 2 degrees of separation from you by asking your friends to list their friends (seeking Bob).
2. Discover all people at 3 degrees of separation from you by asking the people discovered previously to list their friends (seeking Bob).
3. And so on.

C I am not sure.

CQ 15: The preferred way to discover the number of degrees of separation between you and a randomly chosen person (call them Bob), is:

A
1. Ask each of your friends to discover whether Bob is at degree 1 of separation from them.
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1. Discover all people at 2 degrees of separation from you by asking your friends to list their friends (seeking Bob).
2. Discover all people at 3 degrees of separation from you by asking the people discovered previously to list their friends (seeking Bob).
3. And so on.

C I am not sure.

Ans: B (note, not rigourous!) This is the idea of **Breadth First Search**, the topic of today's lecture.

CQ 16: For all vertices v, there is a path $s \rightsquigarrow v$ in G if and only if $\mathit{visited}[v]$ is true at the end.

- A True.
- B False.
- C I am not sure.

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- A True.
- B False.
- C I am not sure.

Ans: A

CQ 17: Let u, v be vertices in a BFS tree. Suppose that $\{u, v\}$ is an edge in the BFS tree. Suppose that $level[u] = 3$. Then we can conclude that

A $level[v] \leq 2$.

B $level[v] \leq 3$.

C $level[v] \leq 4$.

D $level[v] \leq 5$.

D None of A–D.

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A $level[v] \leq 2$.

B $level[v] \leq 3$.

C $level[v] \leq 4$.

D $level[v] \leq 5$.

D None of A–D.

Ans: C

CQ 18: The most efficient method to find a path through a provided maze is

A breadth first search.

B depth first search.

C I am not sure.

CQ 18: The most efficient method to find a path through a provided maze is

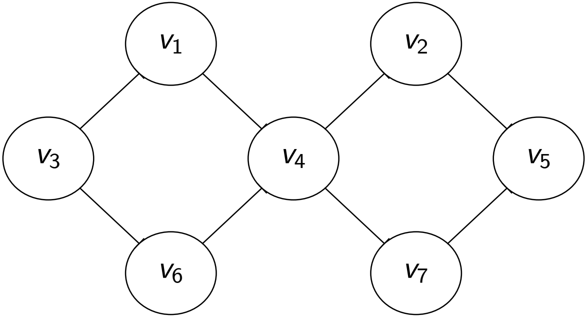
A breadth first search.

B depth first search.

C I am not sure.

Ans: B

CQ 19: Select a **cut vertex** in this graph:



A v_3

B v_4

C v_5

D This graph has no cut vertices.

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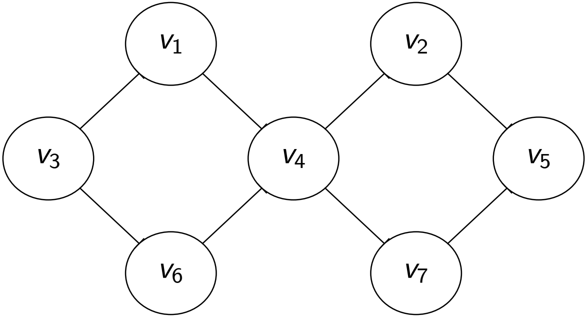

A v_3

B v_4

C v_5

D This graph has no cut vertices.

Ans: B

CQ 20: (From Slide 03) In any directed, weighted graph, a shortest path exists between any two vertices.

A True.

B False.

C I am not sure.

CQ 20: (From Slide 03) In any directed, weighted graph, a shortest path exists between any two vertices.

A True.

B False.

C I am not sure.

Ans: A (See the definition at the bottom of the slide.)

CQ 21: (From Slide 04) If $\langle v_0, v_1, \ldots, v_k \rangle$ is a shortest path from v_0 to v_k, then $\langle v_0, v_1, \ldots, v_i \rangle$ is a shortest path from v_0 to v_i, for any $0 \leq i \leq k$.

A True.

B False.

C I am not sure.

CQ 21: (From Slide 04) If $\langle v_0, v_1, \ldots, v_k \rangle$ is a shortest path from v_0 to v_k, then $\langle v_0, v_1, \ldots, v_i \rangle$ is a shortest path from v_0 to v_i, for any $0 \leq i \leq k$.

A True.

B False.

C I am not sure.

Ans: A (CLRS Lemma 22.1)