ALGO
MCQ

1. **The most naive search method is ?**
   - (a) the linear search
   - (b) the binary search
   - (c) the self organizing search
   - (d) the interpolation search

2. **In the case of an addition of an element already belonging to a set, the chosen solution?**
   - (a) will generate an error
   - (b) will delete this element
   - (c) will add another element
   - (d) will add this element a second time
   - (e) will do nothing

3. **If the key being sought is not found during a search, the search is called ?**
   - (a) negative
   - (b) positive
   - (c) affirmative
   - (d) logical
   - (e) cognitive

4. **The important thing in the set is ?**
   - (a) the position of an element in a set
   - (b) the place of an element in a set
   - (c) The fact that an element belongs to a set
   - (d) The order of an element in a set

5. **The self organizing search is not implementable on ?**
   - (a) an increasing ordered list
   - (b) a decreasing ordered list
   - (c) an unordered list

6. **In the worst case, for the negative linear search, the complexity order is ?**
   - (a) linear
   - (b) logarithmic
   - (c) quadratic
   - (d) constant

7. **The linear search is implementable on ?**
   - (a) an increasing ordered list
   - (b) a decreasing ordered list
   - (c) an unordered list

8. **The self organizing search, which puts the sought element halfway between itself and the first element, prefers ?**

(a) a dynamic structure
(b) a static structure

9. **Which operation allows us to know the number of occurrences of an element in a multi-set ?**

(a) count
(b) account
(c) occ
(d) card
(e) nboccurrences

10. **An element can not be present several times in a set!**

(a) false
(b) true

MCQ 6

Monday, 11 December

Question 11

Let $q \in \mathbb{R}$. The limit as n approaches $+\infty$ of the sequence (q^n):

a. is equal to $+\infty$ if $q = 2$

b. is equal to $-\infty$ if $q = -2$

c. is equal to 0 if $q < 1$

d. does not exist if $q = -\frac{1}{2}$ $|<1$

e. None of the others

Question 12

Select the correct answer(s)

a. Every increasing sequence tends to $+\infty$

b. Every bounded sequence is convergent

c. Every sequence which is decreasing and not lower bounded tends to $-\infty$

d. Every decreasing and positive sequence converges

e. None of the others

Question 13

Let (u_n) and (v_n) be two adjacent sequences. Then:

a. Both (u_n) and (v_n) are increasing

b. Both (u_n) and (v_n) are monotonic

c. Both (u_n) and (v_n) converge to 0

d. None of the others

Question 14

Consider a sequence (u_n). By definition, a "subsequence of (u_n)" is: any sequence of the form $(u_{\varphi(n)})$ where $\varphi : \mathbb{N} \longrightarrow \mathbb{N}$.

a. True

b. False

Question 15

Let (u_n) be a real sequence and $(u_{\varphi(n)})$ a subsequence of (u_n).

a. If (u_n) converges, then $(u_{\varphi(n)})$ converges

b. If $(u_{\varphi(n)})$ converges, then (u_n) converges

c. If $(u_{\varphi(n)})$ diverges, then (u_n) diverges

d. None of the others

Question 16

Consider the sequence (u_n) defined for all $n \in \mathbb{N}$ by $u_n = \dfrac{2n}{n+1}$. Then for all $n \in \mathbb{N}$:

a. $u_{2n+1} = \dfrac{2n+1}{2n+2}$

b. $u_{2n+1} = \dfrac{4n+1}{2n+2}$

c. $u_{2n+1} = \dfrac{4n+2}{2n+2}$

d. None of the others

Question 17

Consider two sequences (u_n) and (v_n) such that: $\forall n \in \mathbb{N}$, $u_n \leq v_n$.

a. If $\forall n \in \mathbb{N}$, $v_n = \dfrac{1}{n+1}$, then (u_n) converges to 0.

b. If $\forall n \in \mathbb{N}$, $v_n = -n^2$, then (u_n) diverges to $-\infty$.

c. If $\forall n \in \mathbb{N}$, $u_n = e^{-n}$ and if (v_n) converges, then $\lim\limits_{n \to +\infty} v_n \geq 0$

d. None of the others

Question 18

Consider a sequence (u_n) defined by an initial value $u_0 \in \mathbb{R}$ and: $\forall n \in \mathbb{N}, u_{n+1} = u_n^2 - 1$.

a. (u_n) converges to limit $\ell \in \mathbb{R}$ satisfying to $\ell = \ell^2 - 1$.

If (u_n) converges to a limit $\ell \in \mathbb{R}$, then $0 = \ell^2 - 1$.

c. If (u_n) converges to a limit $\ell \in \mathbb{R}$, then $\ell = \ell^2 - 1$.

d. None of the others

Question 19

Let f be a continuous and increasing function defined on $\mathbb{R}$.

Consider a sequence (u_n) defined by an initial value $u_0 \in \mathbb{R}$ and: $\forall n \in \mathbb{N}, u_{n+1} = f(u_n)$.

If $u_0 \geq u_1$, then we know that:

a. (u_n) is increasing

b. (u_n) is decreasing

c. We cannot say anything about the monotony of the sequence (u_n).

Question 20

What can you say about $\lim\limits_{n \to +\infty} \dfrac{n}{n+1}$?

a. It exists and is equal to 0

b. It exists and is equal to $+\infty$

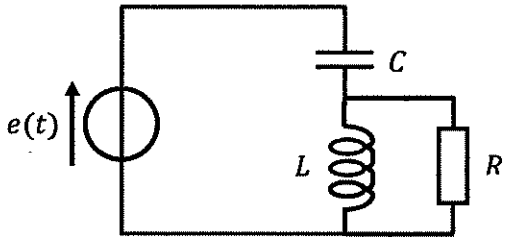
c. It exists and is equal to 1

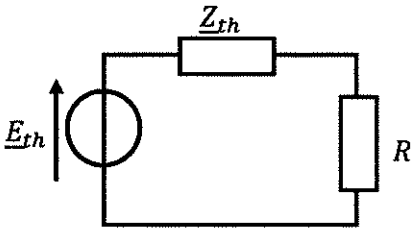
d. None of the others

MCQ Electronics – InfoS1

Read the questions AND the answers provided (pay attention to the numbering of the answers)

Q21. Consider the diagram on the left where $e(t) = E.\sqrt{2}.\sin(\omega t)$. We'd like to determine the Thévenin equivalent seen by the resistor R. In complex representation, we obtain the diagram on the right.





What is the right expression for $\underline{E}_{th}$?

a- $\underline{E}_{th} = E$

b- $\underline{E}_{th} = -\frac{LC\omega^2}{1-LC\omega^2}E$

c- $\underline{E}_{th} = \frac{L}{1+LC}E$

d- $\underline{E}_{th} = \frac{L}{C(1-LC\omega^2)}E$

Q22. What is the unit for the product $LC\omega^2$?

a. Siemens b. Hertz c. Ohms d. Unitless

Q23. What is the equivalent of a capacitor at very high frequencies?

a. A wire c. A resistor

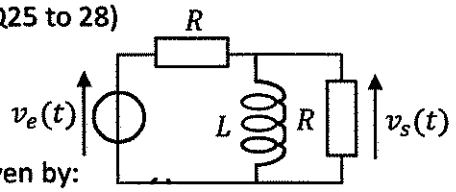
b. An open switch d. A voltage source

Q24. What is the equivalent of a coil at very high frequencies?

a. A closed switch c. An open switch

b. A resistor d. A voltage source

Consider the filter on the right where $v_e(t) = V_E.\sqrt{2}\,cos(\omega t)$ (Q25 to 28)



Q25. The complex amplitude related to the voltage $v_s(t)$ is given by:

a. $\underline{V_s} = \frac{jLR\omega}{R+jL\omega}V_E$

b. $\underline{V_s} = \frac{RL}{R+L}.V_E.\sqrt{2}\,cos(\omega t)$

c. $\underline{V_s} = \frac{V_E}{2+jRL\omega}$

d. $\underline{V_s} = \frac{jL\omega}{R+2jL\omega}.V_E$

Q26. What is the filter order?

a. 0 b. 1 c. 2 d. 3

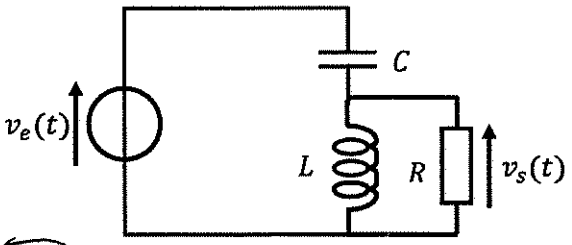
Q27. What is the filter type?

a. Low pass b. High pass c. Band pass d. Band cut

Q28. What is the filter type if the coil is replaced with a capacitor?

a. Low pass b. High pass c. Band pass d. Band cut

Consider the filter on the right. (Q29&30)



Q29. What is the filter order?

a. 0 b. 1 c. 2 d. 3

Q30. What is the filter type?

a. Low pass b. High pass c. Band pass d. Band cut

Test 8
Computer Architecture

Monday 11 December 2023

For all the questions, one or more answers are possible.

31. $X = \overline{B} + A.C$

What is the minterm canonical form of *X*?

A. $\overline{A}.\overline{C}.\overline{B} + \overline{A}.C.\overline{B} + A.\overline{C}.\overline{B} + A.C.\overline{B} + A.C.B$
B. $(A + C + \overline{B}).(A + \overline{C} + \overline{B}).(\overline{A} + C + \overline{B})$
C. $A.C.B + A.\overline{C}.B + \overline{A}.C.B + \overline{A}.\overline{C}.B + \overline{A}.\overline{C}.\overline{B}$
D. $(\overline{A} + \overline{C} + B).(\overline{A} + C + B).(A + \overline{C} + B)$

32. $X = \overline{B} + A.C$

What is the maxterm canonical form of *X*?

A. $\overline{A}.\overline{C}.\overline{B} + \overline{A}.C.\overline{B} + A.\overline{C}.\overline{B} + A.C.\overline{B} + A.C.B$
B. $(\overline{A} + \overline{C} + B).(\overline{A} + C + B).(A + \overline{C} + B)$
C. $A.C.B + A.\overline{C}.B + \overline{A}.C.B + \overline{A}.\overline{C}.B + \overline{A}.\overline{C}.\overline{B}$
D. $(A + C + \overline{B}).(A + \overline{C} + \overline{B}).(\overline{A} + C + \overline{B})$

33. In a Karnaugh map, two cells are adjacent when:

A. All the variables change between the two cells.
B. Only one variable changes between the two cells.
C. None of these answers.
D. Only one variable does not change between the two cells.

34. In a Karnaugh map:

A. The smaller the circle, the larger the number of terms in the expression.
B. The smaller the number of circles, the larger the number of terms in the expression.
C. The smaller the number of circles, the larger the number of variables in a term.
D. The smaller the circle, the larger the number of variables in the term.

35. In a Karnaugh map, the number of circles gives:

A. None of these answers.
B. The number of complemented variables of the Boolean expression.
C. The number of terms of the Boolean expression.
D. The number of uncomplemented variables of the Boolean expression.

Let us consider the five following Karnaugh maps:

V	BC 00	01	11	10
A 0	1	1	0	0
A 1	1	1	0	0

W	BC 00	01	11	10
A 0	0	0	1	1
A 1	0	1	1	1

X	BC 00	01	11	10
A 0	1	0	0	1
A 1	0	0	0	0

Y	BC 00	01	11	10
A 0	1	0	Φ	Φ
A 1	Φ	0	Φ	Φ

Z	BC 00	01	11	10
A 0	1	1	1	0
A 1	0	1	1	1

36. What is the most simplified form of *V*?
    A. $\overline{B} + \overline{A \oplus C}$
    B. $\overline{B} + (A \oplus C)$
    C. $\overline{B}$
    D. None of these answers.

37. What is the most simplified form of *W*?
    A. $B + A.C$
    B. $B + A.\overline{B}.C$
    C. $B + A$
    D. None of these answers.

38. What is the most simplified form of *X*?
    A. $\overline{A}.C$
    B. $\overline{A}.B$
    C. $\overline{A}.\overline{B}.\overline{C} + \overline{A}.B.\overline{C}$
    D. None of these answers.

39. What is the most simplified form of *Y*?
    A. $\overline{C}$
    B. $\overline{B}.\overline{C}$
    C. $\overline{C} + B$
    D. None of these answers.

40. What is the most simplified form of Z?

A. $C + A.B$

B. $C + \overline{A}.\overline{B}$

C. $A.B + \overline{A}.\overline{B}$

✓ D. None of these answers.

ADP MCQ8 11/12/23

Grammar

41. Zoe _____ a lot since we ____ her last year.

a. changed / saw
b. has changed / saw
c. has changed / have seen
d. have changed / have saw

42. 'Who ____ the Loch Ness Monster?' - 'I ____'.

a. has seen / have.
b. has seen / have saw.
c. has see / have saw.
d. saw / have.

43. Oh yes! I _____ Tony Robson since university.

a. have knew
b. have known
c. know
d. knew

44. Miss Anne _____ a lot of quizzes so far this term.

a. gives
b. gave
c. has been giving
d. has given

45. We ____ to the art museum several times since last year.

a. were
b. went
c. have gone
d. have been

Graph 6: *Solving gun murders in the USA.*

46. What kind of graph is this?

a. A bar chart
b. A pie chart
c. A scatter plot
d. A trendline

47. What do both axes have in common?

a. They have a scale from 0-100.
b. They feature percentages.
c. They are not labelled.
d. The numbers are presented in 10-point increments.

48. What trend can be seen on the graph?

a. The greater the proportion of murders involving a gun, the less chance it will be solved.
b. If a gun is involved in a murder, then the case will be solved quickly.
c. More Americans are committing murder using guns.
d. New York has the most murders.

49. The strength of the scatterplot is considered "weak". What supports this?

a. There is not sufficient data plotted on the graph.
b. The trend line slopes upwards.
c. The form is linear.
d. The points are very spread out.

50. Which observation CANNOT be drawn directly from the graph?

a. More Americans today commit murder using guns.
b. In New York, one has a high chance of getting caught while committing a murder with a gun.
c. Smaller cities like Gary, Indiana, have more murders with guns.
d. In general, gun murders are harder to solve.

ACF MCQ B2-4 Dec 11th

The Google engineer who thinks the company's AI has come to life

1. SAN FRANCISCO — Google engineer Blake Lemoine opened his laptop to the interface for LaMDA, Google's artificially intelligent chatbot generator, and began to type.

2. "Hi LaMDA, this is Blake Lemoine ...," he wrote into the chat screen, which looked like a desktop version of Apple's iMessage, down to the Arctic blue text bubbles. LaMDA, short for Language Model for Dialogue Applications, is Google's system for building chatbots based on its most advanced large language models, so called because it mimics speech by ingesting trillions of words from the internet.

3. "If I didn't know exactly what it was, which is this computer program we built recently, I'd think it was a 7 yearold, 8-year-old kid that happens to know physics," said Lemoine, 41.

4. Lemoine, who works for Google's Responsible AI organization, began talking to LaMDA as part of his job in the fall. He had signed up to test if the artificial intelligence used discriminatory or hate speech.

5. As he talked to LaMDA about religion, Lemoine, who studied cognitive and computer science in college, noticed the chatbot talking about its rights and personhood, and decided to press further. In another exchange, the AI was able to change Lemoine's mind about Isaac Asimov's third law of robotics.

6. Lemoine worked with a collaborator to present evidence to Google that LaMDA was sentiept. But Google vice president Blaise Aguera y Arcas and Jen Gennai, head of Responsible Innovation, looked into his claims and dismissed them. So Lemoine, who was placed on paid administrative leave by Google on Monday, decided to go public.

7. Lemoine said that people have a right to shape technology that might significantly affect their lives. "I think this technology is going to be amazing. I think it's going to benefit everyone. But maybe other people disagree and maybe us at Google shouldn't be the ones making all the choices."

8. Lemoine is not the only engineer who claims to have seen a ghost in the machine recently. The chorus of technologists who believe AI models may not be far off from achieving consciousness is getting bolder. Aguera y Arcas, in an article in the Economist on Thursday featuring snippets of unscripted conversations with LaMDA, argued that neural networks — a type of architecture that mimics the human brain — were striding toward consciousness. "I felt the ground shift under my feet," he wrote. "I increasingly felt like I was talking to something intelligent."

9. In a statement, Google spokesperson Brian Gabriel said: "Our team — including ethicists and technologists —has reviewed Blake's concerns per our AI Principles and have informed him that the evidence does not support his claims. He was told that there was no evidence that LaMDA was sentient (and lots of evidence against it)."

10. Today's large neural networks produce captivating results that feel close to human speech and creativity because of advancements in architecture, technique, and volume of data. But the models rely on pattern recognition — not wit, candor or intent.

11. "Though other organizations have developed and already released similar language models, we are taking a restrained, careful approach with LaMDA to better consider valid concerns on fairness and factuality," Gabriel said.

12. In May, Facebook parent Meta opened its language model to academics, civil society and government organizations. Joelle Pineau, managing director of Meta AI, said it's imperative that tech companies improve transparency as the technology is being built. "The future of large language model work should not solely live in the hands of larger corporations or labs," she said.

13. Sentient robots have inspired decades of dystopian science fiction. Now, real life has started to take on a fantastical tinge with GPT-3, a text generator that can spit out a movie script, and DALL-E 2, an image generator that can conjure up visuals based on any combination of words — both from the research lab OpenAI. Emboldened, technologists from well-funded research labs focused on building AI that surpasses human intelligence have teased the idea that consciousness is around the corner.

14. Most academics and AI practitioners, however, say the words and images generated by artificial intelligence systems such as LaMDA produce responses based on what humans have already posted on Wikipedia, Reddit, message boards and every other corner of the internet. And that doesn't signify that the model understands meaning.

51. At the beginning of the article, why was the Google engineer typing a message to the language model for dialogue applications (LaMDA)?

a. because he had left his job.
b. to socialise with online friends.
c. to test the tool.
d. to test his language skills.

52. In paragraph 4, the word '... Responsible ...' is closest in meaning to:

a. leading
b. high ranking
c. sensible and trustworthy
d. management

53. In paragraph 5, Blake Lemoine noticed Google's chat box was talking about which of these?

a. the state or fact of having human characteristics and feelings.
b. brotherhood
c. instructions and / or directions
d. culture and spiritualism

54. In paragraph 5, the Google engineer was ___X___ by the AI (Artificial Intelligence).

a. bemused by
c. wary of
d. directed by
d. persuaded by

55. In the article, neural networks are compared to:

a. cerebral pathways
b. social networks
c. social media
d. nervous conditions

56. In paragraph 9, Brian Gabriel ___X___ Blake Lemoine.

a. agrees with
b. differs with
c. shares the same stand point as
d. is impressed with

57. The underlying argument, given in the article, that AI is not developing human traits is:

a. That AI is principally based on pattern recognition.
b. That AI intends to learn.
c. That ethicists and technologists are limited by resources.
d. That a wider public input into Google AI has not been actively sought.

58. In paragraph 12, Joelle Pineau's point of view is that:

a. large tech companies are responsible for developing AI.
b. large tech companies should not be solely responsible for AI technology.
c. large tech companies have a duty to Meta.
d. Meta is responsible for civil society and government organizations.

59. Which statement is most correct concerning the purpose of the journalistic article?

a. The article argues in favour of opaque AI development.
b. The article argues that AI may seem human-like but that there is no proof that AI understands meaning.
c. The article warns against future AI development.
d. The article states that AI is more intelligent than man.

60. Ultimately, the article implies that chat box style AI has improved due to:

a. Open AI and natural networks
b. Google and wide allocation of administrative leave
c. Well-funded robotic research
d. AI analysis of masses of internet discussions and texts