

ALGO  
QCM

1. La méthode de recherche la plus naïve est la recherche ?
  - (a) séquentielle
  - (b) dichotomique
  - (c) autoadaptative
  - (d) par interpolation
  
2. Dans le cas d'un ajout d'un élément appartenant déjà à un ensemble, la solution retenue ?
  - (a) générera une erreur
  - (b) supprimera cet élément
  - (c) ajoutera un autre élément
  - (d) ajoutera l'élément une deuxième fois
  - (e) ne fera rien
  
3. Lors d'une recherche si la clé recherchée n'est pas trouvée, on parle de recherche ?
  - (a) négative
  - (b) positive
  - (c) affirmative
  - (d) logique
  - (e) cognitive
  
4. L'important dans les ensembles c'est ?
  - (a) la position d'un élément dans un ensemble
  - (b) la place d'un élément dans un ensemble
  - (c) l'appartenance d'un élément à un ensemble
  - (d) l'ordre d'un élément dans un ensemble
  
5. la recherche autoadaptative n'est pas implémentable sur ?
  - (a) liste triée croissante
  - (b) liste triée décroissante
  - (c) liste non triée
  
6. La complexité au pire de la recherche négative séquentielle est d'ordre ?
  - (a) linéaire
  - (b) logarithmique
  - (c) quadratique
  - (d) constant
  
7. La recherche séquentielle peut se faire sur ?
  - (a) liste triée croissante
  - (b) liste triée décroissante
  - (c) liste non triée

8. La recherche autoadaptative ramenant l'élément trouvé à la moitié de la distance le séparant de la première place, préfère ?
- (a) une structure dynamique
  - (b) une structure statique
9. Quelle opération permet de récupérer le nombre d'occurrences d'un élément dans un multi-ensemble ?
- (a) count
  - (b) compte
  - (c) occ
  - (d) card
  - (e) nboccurrences
10. Un élément ne peut pas être présent plusieurs fois dans un ensemble !
- (a) faux
  - (b) vrai



# QCM 6

lundi 11 décembre

## Question 11

Soit  $q \in \mathbb{R}$ . La limite en  $+\infty$  de la suite  $(q^n)$  :

- a. est égale à  $+\infty$  si  $q = 2$
- b. est égale à  $-\infty$  si  $q = -2$
- c. est égale à 0 si  $q < 1$
- d. n'existe pas si  $q = -\frac{1}{2}$
- e. Aucune des autres réponses

## Question 12

Cochez la(les) bonne(s) réponse(s)

- a. Toute suite croissante tend vers  $+\infty$
- b. Toute suite bornée est convergente
- c. Toute suite non minorée et décroissante tend vers  $-\infty$
- d. Toute suite décroissante et positive converge
- e. Aucune des autres réponses

## Question 13

Soient  $(u_n)$  et  $(v_n)$  deux suites adjacentes. On a :

- a.  $(u_n)$  et  $(v_n)$  sont croissantes
- b.  $(u_n)$  et  $(v_n)$  sont monotones
- c.  $(u_n)$  et  $(v_n)$  convergent vers 0
- d. Aucune des autres réponses

## Question 14

Soit  $(u_n)$  une suite réelle. On appelle «suite extraite de  $(u_n)$ » toute suite de la forme  $(u_{\varphi(n)})$  où  $\varphi : \mathbb{N} \rightarrow \mathbb{N}$ .

- a. Vrai
- b. Faux

### Question 15

Soient  $(u_n)$  une suite réelle et  $(u_{\varphi(n)})$  une suite extraite de  $(u_n)$ . On a :

- a. Si  $(u_n)$  converge alors  $(u_{\varphi(n)})$  converge.
- b. Si  $(u_{\varphi(n)})$  converge alors  $(u_n)$  converge.
- c. Si  $(u_{\varphi(n)})$  diverge alors  $(u_n)$  diverge.
- d. Aucune des autres réponses

### Question 16

On considère la suite  $(u_n)$  définie pour tout entier  $n \in \mathbb{N}$  par  $u_n = \frac{2n}{n+1}$ . Pour tout entier naturel  $n$ , on a

- a.  $u_{2n+1} = \frac{2n+1}{2n+2}$
- b.  $u_{2n+1} = \frac{4n+1}{2n+2}$
- c.  $u_{2n+1} = \frac{4n+2}{2n+2}$
- d. Aucune des autres réponses

### Question 17

Soient deux suites réelles  $(u_n)$  et  $(v_n)$  telles que :  $\forall n \in \mathbb{N}, u_n \leq v_n$ .

- a. Si  $\forall n \in \mathbb{N}, v_n = \frac{1}{n+1}$  alors  $(u_n)$  converge vers 0.
- b. Si  $\forall n \in \mathbb{N}, v_n = -n^2$  alors  $(u_n)$  diverge vers  $-\infty$ .
- c. Si  $\forall n \in \mathbb{N}, u_n = e^{-n}$  et si  $(v_n)$  converge alors  $\lim_{n \rightarrow +\infty} v_n \geq 0$
- d. Aucune des autres réponses

### Question 18

Soit une suite  $(u_n)$  définie par une valeur initiale  $u_0 \in \mathbb{R}$  et :  $\forall n \in \mathbb{N}, u_{n+1} = u_n^2 - 1$ .

- a.  $(u_n)$  converge vers une limite  $\ell \in \mathbb{R}$  vérifiant  $\ell = \ell^2 - 1$ .
- b. Si  $(u_n)$  converge vers une limite  $\ell \in \mathbb{R}$ , alors  $0 = \ell^2 - 1$ .
- c. Si  $(u_n)$  converge vers une limite  $\ell \in \mathbb{R}$ , alors  $\ell = \ell^2 - 1$ .
- d. Aucune des autres réponses

## Question 19

Soit  $f$  une fonction continue et croissante sur  $\mathbb{R}$ .

Considérons une suite  $(u_n)$  définie par une valeur initiale  $u_0 \in \mathbb{R}$  et :  $\forall n \in \mathbb{N}, u_{n+1} = f(u_n)$ .

Si  $u_0 \geq u_1$ , on peut affirmer que :

- a.  $(u_n)$  est croissante.
- b.  $(u_n)$  est décroissante.
- c. On ne peut rien dire sur la monotonie de la suite  $(u_n)$ .

## Question 20

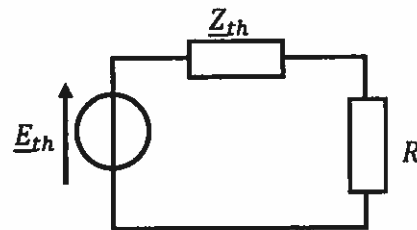
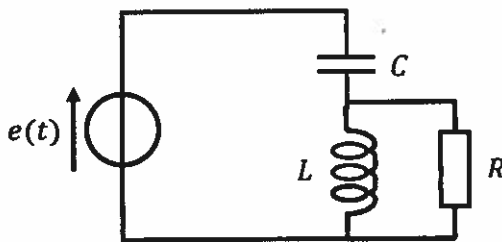
$$\lim_{n \rightarrow +\infty} \frac{n}{n+1}$$

- a. est égale à 0
- b. est égale à  $+\infty$
- c. est égale à 1
- d. Aucune des autres réponses

## QCM Electronique – InfoS1

Pensez à bien lire les questions ET les réponses proposées (attention à la numérotation des réponses)

**Q21.** On considère le circuit de gauche, ou  $e(t) = E \cdot \sqrt{2} \cdot \sin(\omega t)$ . On veut déterminer le générateur de Thévenin vu par la résistance  $R$ . En représentation complexe, on obtient alors le schéma de droite.



Quelle est l'expression de  $\underline{E}_{th}$  ?

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.** Quelle est l'unité du produit  $LC\omega^2$  ?

a. Des Siemens

b. Des Hertz

c. Des Ohms

d. Il n'y en a pas

**Q23.** A quoi est équivalent un condensateur en très hautes fréquences ?

a. Un fil

c. Une résistance

b. Un interrupteur ouvert

d. Un générateur de tension

**Q24.** A quoi est équivalent une bobine en très hautes fréquences ?

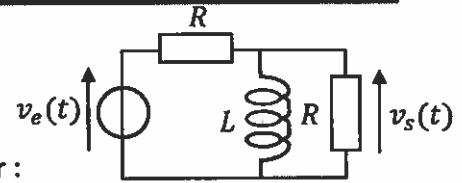
a. Un interrupteur fermé

c. Un interrupteur ouvert

b. Une résistance

d. Un générateur de tension

Soit le filtre ci-contre, où  $v_e(t) = V_E \cdot \sqrt{2} \cos(\omega t)$  (Q25 à 28)



Q25. L'amplitude complexe de la tension  $v_s(t)$  est donnée par :

- a.  $\underline{V}_s = \frac{jLR\omega}{R+jL\omega} V_E$
- b.  $\underline{V}_s = \frac{RL}{R+L} \cdot V_E \cdot \sqrt{2} \cos(\omega t)$
- c.  $\underline{V}_s = \frac{V_E}{2+jRL\omega}$
- d.  $\underline{V}_s = \frac{jL\omega}{R+2jL\omega} \cdot V_E$

Q26. Quel est l'ordre de ce filtre ?

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

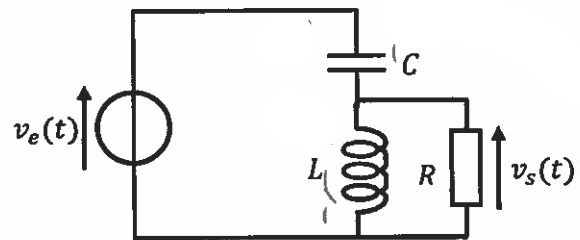
Q27. De quel type de filtre s'agit-il ?

- a. Passe-Bas
- b. Passe-Haut
- c. Passe-Bande
- d. Coupe-Bande

Q28. Quel type de filtre obtient-on si on remplace ~~le condensateur par une bobine~~ *la bobine par un condensateur* ?

- a. Passe-Bas
- b. Passe-Haut
- c. Passe-Bande
- d. Coupe-Bande

Soit le filtre ci-contre. (Q29&30)



Q29. Quel est l'ordre de ce filtre ?

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

Q30. De quel type de filtre s'agit-il ?

- a. Passe-Bas
- b. Passe-Haut
- c. Passe-Bande
- d. Coupe-Bande

# QCM 8

## Architecture des ordinateurs

Lundi 11 décembre 2023

Pour toutes les questions, une ou plusieurs réponses sont possibles.

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

Quelle est la première forme canonique de  $X$  ?

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

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

Quelle est la seconde forme canonique de  $X$  ?

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

33. Dans un tableau de Karnaugh, deux cases sont adjacentes si :

- A. Toutes les variables changent entre les deux cases.
- B. Une seule variable change entre les deux cases.
- C. Aucune de ces réponses.
- D. Une seule variable ne change pas entre les deux cases.

34. Dans un tableau de Karnaugh :

- A. Plus une bulle est petite, plus le nombre de termes de l'expression est grand.
- B. Plus le nombre de bulles est petit, plus le nombre de termes de l'expression est grand.
- C. Plus le nombre de bulles est petit, plus le nombre de variables dans un terme est grand.
- D. Plus une bulle est petite, plus le nombre de variables dans le terme est grand.

35. Dans un tableau de Karnaugh, le nombre de cercles correspond :

- A. Aucune de ces réponses.
- B. Au nombre de variables complémentées de l'expression booléenne.
- C. Au nombre de termes de l'expression booléenne.
- D. Au nombre de variables non complémentées de l'expression booléenne.



Soit les cinq diagrammes de Karnaugh suivants :

BC

|   |   |    |    |    |    |
|---|---|----|----|----|----|
| A | V | 00 | 01 | 11 | 10 |
| 0 | 1 | 1  | 1  | 0  | 0  |
| 1 | 1 | 1  | 1  | 0  | 0  |

BC

|   |   |    |    |    |    |
|---|---|----|----|----|----|
| A | W | 00 | 01 | 11 | 10 |
| 0 | 0 | 0  | 0  | 1  | 1  |
| 1 | 0 | 1  | 1  | 1  | 1  |

BC

|   |   |    |    |    |    |
|---|---|----|----|----|----|
| A | X | 00 | 01 | 11 | 10 |
| 0 | 1 | 1  | 0  | 0  | 1  |
| 1 | 0 | 0  | 0  | 0  | 0  |

BC

|   |   |        |    |        |        |
|---|---|--------|----|--------|--------|
| A | Y | 00     | 01 | 11     | 10     |
| 0 | 1 | 1      | 0  | $\Phi$ | $\Phi$ |
| 1 | 0 | $\Phi$ | 0  | $\Phi$ | $\Phi$ |

BC

|   |   |    |    |    |    |
|---|---|----|----|----|----|
| A | Z | 00 | 01 | 11 | 10 |
| 0 | 1 | 1  | 1  | 1  | 0  |
| 1 | 0 | 1  | 1  | 1  | 1  |

36. Quelle est la forme la plus simplifiée de V ?

- A.  $\bar{B} + \bar{A}\oplus C$
- B.  $\bar{B} + (A\oplus C)$
- C.  $\bar{B}$
- D. Aucune de ces réponses.

37. Quelle est la forme la plus simplifiée de W ?

- A.  $B + A.C$
- B.  $B + A.\bar{B}.C$
- C.  $B + A$
- D. Aucune de ces réponses.

38. Quelle est la forme la plus simplifiée de X ?

- A.  $\bar{A}.C$
- B.  $\bar{A}.B$
- C.  $\bar{A}.B.\bar{C} + \bar{A}.B.C$
- D. Aucune de ces réponses.

39. Quelle est la forme la plus simplifiée de Y ?

- A.  $\bar{C}$
- B.  $\bar{B}.\bar{C}$
- C.  $\bar{C} + B$
- D. Aucune de ces réponses.

40. Quelle est la forme la plus simplifiée de  $Z$  ?

A.  $C + A.B$

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

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

D. Aucune de ces réponses.

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.

**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 sentient. 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
  - b. wary of
  - c. 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