ALGO
QCM

20

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

15

lundi 9 décembre

Question 11

Soit (u_n) et (v_n) deux suites vérifiant : $\forall n \in \mathbb{N}$, $|u_n| \leq v_n$. Alors :

- a. Si (v_n) converge vers 0 alors (u_n) converge vers 0.
- b. Si (v_n) tend vers $+\infty$ alors (u_n) tend vers $+\infty$.
- c. Si (v_n) tend vers 2 alors (u_n) tend vers 2.
- d. Aucune des autres réponses

Question 12

Quelle phrase est correctement écrite ?

- a. La suite u_n est strictement croissante.
- b. e^n ne converge pas.
- c. $\left(\frac{1}{n+1}\right)$ est bornée.
- d. Aucune phrase n'est bien écrite.

Question 13

Soit (u_n) une suite telle que $\forall n \in \mathbb{N}$, $u_n < -1$. On a

- a. Si (u_n) est croissante alors (u_n) converge.
- b. Si (u_n) est croissante et convergente alors (u_n) tend vers -1.
- c. Si (u_n) est décroissante alors (u_n) converge.
- d. (u_n) ne peut pas être monotone.
- e. Aucune des autres réponses

Question 14

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 décroissantes

c. (u_n) et (v_n) sont de sens de monotonie opposé

d. Aucune des autres réponses

Question 15

Soient (u_n) une suite décroissante et (v_n) une suite croissante avec $\forall n \in \mathbb{N}$, $v_n \leq u_n$. On a

a. (u_n) et (v_n) sont adjacentes.

b. Si $\lim\limits_{n\to+\infty} u_n - v_n = 0$ alors (u_n) et (v_n) convergent.

c. $\lim\limits_{n\to+\infty} u_n = \lim\limits_{n\to+\infty} v_n$

d. Aucune des autres réponses

Question 16

On considère la suite définie pour tout $n \in \mathbb{N}$ par $u_n = \dfrac{2n}{n+3}$. Pour tout $n \in \mathbb{N}$, on a

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

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

c. $u_{2n+1} = \dfrac{2n+3}{2n+4}$

d. Aucune des autres réponses

Question 17

Soit (u_n) une suite.

a. Si (u_n) converge alors (u_{2n}) converge.

b. Si (u_n) diverge alors (u_{2n}) diverge.

c. Si (u_{2n}) converge alors (u_n) converge.

d. Si (u_{2n}) diverge alors (u_n) diverge.

e. Aucune des autres réponses

Question 18

Cochez la(les) suite(s) divergente(s) :

a. (e^{-n})

b. (n^2)

c. $((-1)^n)$

d. $\left(\frac{1}{n+1}\right)$

e. Aucune des autres réponses

Question 19

Soit $q \in \mathbb{R}$. On considère la suite (q^n).

a. Si $q > 1$, la suite converge vers 0.

b. Si $q > 1$, la suite diverge vers $+\infty$.

c. Si $q < 1$, la suite converge vers 0.

d. Si $q < 1$, la suite diverge vers $+\infty$.

e. Aucune des autres réponses

Question 20

Soit q un réel différent de 1. La somme $\sum_{k=0}^{n} q^k$ vaut

a. $\frac{q^n}{1-q}$

b. $\frac{1-q^n}{1-q}$

c. $\frac{1+q^n}{1-q}$

d. $\frac{1-q^{n+1}}{1-q}$

e. Aucune des autres réponses

QCM 4
Architecture des ordinateurs

Lundi 9 décembre 2024

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

21. $\overline{A \oplus B}$ =
   - A. $\overline{A}.\overline{B} + A.B$
   - B. $\overline{A} \oplus B$
   - C. $\overline{A}.B + A.\overline{B}$
   - D. $\overline{A} \oplus \overline{B}$

22. $A.B + A.B.C + A.B.C.D$ =
   - A. A.B.C
   - B. A.B.C.D
   - C. Aucune de ces réponses.
   - D. A.B

23. $A + \overline{A}.B + \overline{A}.B.C + \overline{A}.B.C.D$ =
   - A. A
   - B. Aucune de ces réponses.
   - C. 1
   - D. A + B

24. $X.(\overline{Y} + Z) + Y.\overline{X}.\overline{Z}$ =
   - A. $X \oplus (Y.Z)$
   - B. $X \oplus (Y.\overline{Z})$
   - C. $X \oplus (\overline{Y}.Z)$
   - D. $X \oplus (\overline{Y}.\overline{Z})$

25. $\overline{X.Y + Z}$ =
   - A. $\overline{X}.\overline{Z} + \overline{Y}.\overline{Z}$
   - B. $\overline{X}.\overline{Y}.\overline{Z}$
   - C. $\overline{X}.\overline{Y} + \overline{Z}$
   - D. $\overline{X}.\overline{Y} + \overline{Y}.\overline{Z}$

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

- A. X est une première forme canonique.
- B. X est une seconde forme canonique.
- C. X est une somme de produits.
- D. Aucune de ces réponses.

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

- A. X est une première forme canonique.
- B. X est une somme de produits.
- C. X est une seconde forme canonique.
- D. Aucune de ces réponses.

28. $X = A.B + \overline{A}.B + \overline{A}.\overline{B}$

- A. X est une première forme canonique.
- B. X est une seconde forme canonique.
- C. X est une somme de produits.
- D. Aucune de ces réponses.

Soit la table de vérité ci-dessous.

A	B	C	Z
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

29. Quelle est la première forme canonique de Z ?

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

30. Quelle est la seconde forme canonique de Z ?

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

ACF MCQ B2-2 Dec 9th

Read the text and answer the MCQs on the following page

The Internet of Bodies Will Change Everything, for Better or Worse

Maria Gardner, October 29, 2020 (RAND Corporation, nonprofit institution)

Ross Compton was there when a fire ravaged his $400,000 home in Middletown, Ohio, in September 2016. Fortunately, Compton told investigators, he was able to **stuff** a few bags with several possessions—including the charger for an external heart pump he needed to survive—before shattering a window with his cane and escaping. But as the smoke cleared, police began to suspect that Compton's story was a fabrication. His statements were inconsistent. The rubble smelled of gasoline. And it seemed implausible that someone fleeing a burning house—especially someone with a medical condition like Compton's—could execute such a complex escape plan. Eventually, investigators were able to indict Compton on felony charges of aggravated arson and insurance fraud. Their star witness? His pacemaker.

Police obtained a warrant to retrieve data on Compton's heart activity before, during, and after the fire. After reviewing this information, a cardiologist concluded that it was "highly improbable" Compton would have been able to escape the flames so quickly, while **lugging** so many belongings. Compton pleaded not guilty. His attorney argued that the pacemaker data should be thrown out; including it would violate doctor-patient privilege and Compton's constitutional right to privacy, the lawyer said.

The case was strange, arguably sad, and fraught with difficult questions. Regardless of whether Compton really torched his house, should a life-saving device inside someone's body be part of a case that might put them behind bars? This may seem like a one-of-a-kind chain of events, an aberration. But as industries usher in a new era of devices that track personal information by leveraging the internet and the human body in equal measure, it won't be the last.

This type of technology, appropriately dubbed the Internet of Bodies (IoB), has the potential to improve our lives in countless ways. But the risks are just as legion. A new RAND study explores the Internet of Bodies, identifying implications for policy that could help maximize the IoB's upside while mitigating these risks. "**When it comes to regulating IoB, it's the Wild West**," said Mary Lee, a mathematician at RAND and lead author of the study. "There are many benefits to these technologies that some consider too great to be slowed down by policy. But we need to have a larger discussion about what those benefits will cost us—and how we might avoid some of the risk altogether."

Internet-connected devices like smart thermostats, voice-activated assistants, and web-enabled refrigerators have become ubiquitous in American homes. These technologies are part of the Internet of Things (IoT), which has **flourished** in recent years as consumers and businesses flock to smart devices for convenience, efficiency, and, in many cases, fun.

Internet of Bodies technologies fall under the broader IoT umbrella. But as the name suggests, IoB devices introduce an even more intimate interplay between humans and gadgets. IoB devices monitor the human body, collect health metrics and other personal information, and transmit those data over the internet. Many devices, such as fitness trackers, are already in use. "There are vast amounts of data being collected, and the regulations about that data are really murky," Lee said. "There's not a lot of clarity about who owns the data, how it's being used, and even who it can be sold to." Lee and her colleagues examined the risks that IoB devices could pose across three areas: data privacy, cybersecurity, and ethics.

31. In paragraph 1, line 3, "**to stuff**" means:
(A) to take
(B) to fill
(C) to find
(D) to arrange

32. What aspect of Compton's escape story raised suspicion about his ability to flee the fire?
(A) The condition of his heart at the time of the fire
(B) The volume of items he claimed to carry out
(C) The speed at which he escaped with his cane
(D) The time of day the fire occurred

33. Which key piece of evidence did investigators rely on to indict Compton?
(A) His inconsistent statements
(B) His pacemaker data
(C) Testimony from his neighbors
(D) Gasoline traces found in the rubble

34. In paragraph 2, line 3, the word "**lugging**" means:
(A) to throw
(B) to look for
(C) to move around
(D) to carry

35. Why did Compton's lawyer argue that the pacemaker data should be excluded from the case?
(A) It was illegally obtained
(B) It went against his right to privacy
(C) The data was unreliable
(D) The pacemaker didn't work correctly at the time of the fire

36. What does Mary Lee mean when she says: ***When it comes to regulating IoB, it's the Wild West***?
(A) There are strict laws governing IoB technology.
(B) IoB technology is new and largely unregulated, with few rules in place.
(C) IoB technology is only used in rural areas.
(D) IoB technology is very dangerous and outlawed in most places.

37. In paragraph 5, line 3, the verb "**flourished**" means:
(A) Struggled to grow
(B) Declined rapidly
(C) Developed successfully
(D) Remained stagnant

38. According to the text, what is one major issue surrounding Internet of Bodies (IoB) technologies?
(A) The difficulty in collecting accurate health metrics
(B) The lack of clarity about who owns and can sell the collected data
(C) The high cost of IoB devices, making them inaccessible to most consumers
(D) Their limited potential to improve healthcare

39. Which of the following areas did the RAND study identify as a key concern for IoB technologies?
(A) Energy consumption and sustainability
(B) Interoperability between devices
(C) Data privacy, cybersecurity, and ethics
(D) Device affordability and maintenance costs

40. Which of the following IoT devices in NOT mentioned in the text?
(A) Smart refrigerator
(B) Smart watch
(C) Smart thermostat
(D) Voice activated assistant