ALGO
QCM

1. **Quel élément n'est pas dans la signature d'un type abstrait ?**
   - (a) Les TYPES
   - (b) Les OPERATIONS
   - \ (c) Les PRECONDITIONS

2. **La construction d'une liste récursive est basée entre autres sur ?**
   - (a) La suppression du $K^{ième}$ élément d'une liste
   - \ (b) La récupération du reste de la liste
   - (c) L'insertion d'un élément à la $K^{ième}$ place
   - \ (d) L'ajout d'un élément en tête de liste $\lor$

3. **Quelles opérations ne définissent pas une liste récursive ?**
   - \ (a) debut
   - \ (b) longueur
   - (c) fin
   - (d) cons
   - \ (e) ième

4. **Pour la déclaration**

   ```
   TYPES    true
   UTILISE but, incredible
   ```

   l'opération thats : incredible x but -> true est ?
   - (a) Un observateur
   - \ (b) Une opération interne
   - (c) Un rapporteur
   - (d) Une opération externe
   - (e) Un observeur

5. **Une opération utilisée pour préciser le domaine de définition d'une autre est ?**
   - (a) Une opération ponctuelle
   - \ (b) Une opération auxiliaire
   - (c) Une opération partielle
   - (d) Une précondition

6. **Un type algébrique abstrait doit être ?**
   - \ (a) Complet
   - (b) Conséquent
   - \ (c) Consistant
   - (d) Complément

7. Que représentent opé1 et opé2 dans l'axiome suivant (dans lequel e est un élément et l une liste) opé1(opé2 (e,l)) = l ?

   (a) opé1 = fin, opé2 = tête

   (b) opé1 = cons, opé2 = fin

   \ (c) opé1 = fin, opé2 = cons

   (d) opé1 = cons, opé2 = tête

8. Que représentent opé1 et opé2 dans l'axiome suivant (dans lequel e est un élément et l une liste) opé1(opé2 (e,l)) = e ?

   (a) opé1 = premier, opé2 = tête

   (b) opé1 = cons, opé2 = premier

   \ (c) opé1 = premier, opé2 = cons

   (d) opé1 = fin, opé2 = premier

9. Une opération qui n'est pas définie partout est ?

   (a) Une opération ponctuelle

   (b) Une opération auxiliaire

   \ (c) Une opération partielle

   (d) Une précondition

10. Pour la déclaration

    ```
    TYPES    Vrai, Ouf
    UTILISE De, Truc
    ```

    l'opération c'est-un : Vrai x Truc x De -> Ouf est ?

    (a) Un observateur

    \ (b) Une opération interne

    (c) Une opération externe

    (d) Un observeur
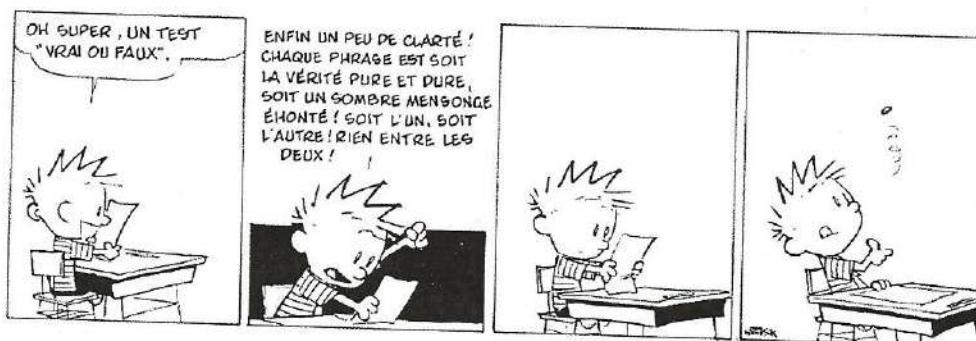
QCM 8

lundi 10 octobre 2022

Question 11

Soient A et B deux événements d'un espace probabilisé fini $(\Omega, \mathscr{P}(\Omega), P)$. On a

    a. $P(\Omega) = 0$

    b. $P(A \cup B) = P(A) + P(B)$

    c. $P(A \cap B) = P(A) \times P(B)$

    d. $0 \leq P(A) \leq 1$

    e. Aucune des autres réponses

Question 12

On tire au hasard une carte dans un jeu classique de 32 cartes. On considère l'événement A : « La carte tirée est un roi » et l'événement B : « la carte tirée est un carreau ». On a

    a. $P(A \cup B) = \dfrac{1}{32}$

    b. $P(A \cup B) = \dfrac{12}{32}$

    c. $P(A \cap B) = \dfrac{1}{32}$

    d. $P(A \cap B) = \dfrac{12}{32}$

    e. Aucune des autres réponses

Question 13

Dans une urne, il y a 4 boules blanches et 3 boules vertes. Toutes les boules sont indiscernables au toucher. On tire successivement 3 boules de l'urne en remettant après chaque tirage la boule tirée dans l'urne. La probabilité d'avoir au moins une boule blanche est égale à

    a. $\left(\dfrac{4}{7}\right) \times \left(\dfrac{3}{7}\right)^2$

    b. $\left(\dfrac{4}{7}\right)^3$

    c. $1 - \left(\dfrac{3}{7}\right)^3$

    d. $\left(\dfrac{3}{7}\right)^3$

    e. Aucune des autres réponses

3

Question 14

Soient A et B deux événements de probabilités non nulles d'un espace probabilisé fini $(\Omega, \mathscr{P}(\Omega), P)$. On a

   a. $P(A \mid B) = \dfrac{P(A \cup B)}{P(B)}$

   b. $P(A \mid B) = \dfrac{P(A \cap B)}{P(B)}$

   c. $P(A \mid B) = \dfrac{P(A \cup B)}{P(A)}$

   d. $P(A \mid B) = \dfrac{P(A \cap B)}{P(A)}$

   e. Aucune des autres réponses

Question 15

Soient A et B deux événements indépendants d'un espace probabilisé fini $(\Omega, \mathscr{P}(\Omega), P)$. On suppose que $P(A) = \dfrac{1}{6}$ et $P(B) = \dfrac{2}{3}$. On a

   a. $P(A \cap B) = \dfrac{5}{6}$

   b. $P(A \cap B) = \dfrac{1}{9}$

   c. Aucune des autres réponses

Question 16

Soient A et B deux événements de probabilités non nulles d'un espace probabilisé fini $(\Omega, \mathscr{P}(\Omega), P)$. On a

   a. $P(A \mid B) \times P(B) = P(B \mid A) \times P(A)$

   b. $P(A \mid B) \times P(A) = P(B \mid A) \times P(B)$

   c. $P(A \mid B) = P(B)$

   d. $P(A \mid B) = P(A)$

   e. Aucune des autres réponses

4

Question 17

Soient a et b deux réels non nuls. Cochez la(les) bonne(s) réponse(s)

    a. $(a+b)^{20} = \sum\limits_{k=0}^{20} a^k b^{20-k}$

    b. $(a+b)^{20} = \sum\limits_{k=0}^{20} \binom{20}{k} a^k b^k$

    c. $(a+1)^{20} = \sum\limits_{k=0}^{20} \binom{20}{k} a^{20-k}$

    d. $(a+1)^{20} = \sum\limits_{k=0}^{20} \binom{20}{k} a^k$

    e. Aucune des autres réponses

Question 18

Soient $n \in \mathbb{N}^*$ et $k \in [\![0, n]\!]$. Le coefficient binomial $\binom{n}{k}$

    a. est égal à $\dfrac{n!}{(n-k)!}$

    b. est égal à $\dfrac{n!}{(n-k)! \times k!}$

    c. représente le nombre de sous-ensembles à $n-k$ éléments d'un ensemble contenant n éléments. $\vee$

    d. représente le nombre de façons de tirer successivement et sans remise k boules d'une urne en contenant n. $\vee$

    e. Aucune des autres réponses

Question 19

Une primitive sur $\mathbb{R}$ de $x \longmapsto \dfrac{1}{x^2+1}$ est

    a. $x \longmapsto \ln(x^2+1)$

    b. $x \longmapsto \dfrac{1}{2}\ln(1+x^2)$

    c. $x \longmapsto \arctan(x)$

    d. Aucune des autres réponses

Question 20

Une primitive sur $]0, +\infty[$ de $x \longmapsto \cos\left(3x^2 + 2\right)$ est

   a. $x \longmapsto \sin\left(3x^2 + 2\right)$

   b. $x \longmapsto 6x \sin\left(3x^2 + 2\right)$

   c. $x \longmapsto -6x \sin\left(3x^2 + 2\right)$

   d. $x \longmapsto \dfrac{\sin(3x^2 + 2)}{6x}$

   e. Aucune des autres réponses

6

Grammar

21. I _____ tap water with lime.

A) am liking
B) 'm liking
C) like
D) likes

22. Charles and Camilla _____ with us at the moment.

A) are staying
B) 're staying
C) stay
D) staying

23. We _____ to the bowling alley every day.

A) aren't going
B) don't go
C) do not goes
D) not going

24. George : " What _____ ? "

Fatou : "I'm listening to my new MP3 player."

A) do you do
B) do you doing
C) are you do
D) are you doing

25. I _____ my friends in the café after school on Fridays.

A) meet
B) 'm meeting
C) meeting
D) is meeting

7

Reading comprehension:

Pop Mart: China's mystery toymaker becomes multi-billionaire

By Justin Harper
Business reporter, BBC News

Published 11/12/2020

A Chinese mystery toymaker has seen his wealth surge after his company was floated on the stock market on Friday.

Pop Mart, founded by Wang Ning, has grown rapidly to become a company worth around $7bn (£5.3bn).

The firm sells collectible figures for about $8 each in packaging that doesn't allow buyers to see what's inside.

Mr Wang owns around 50% of Pop Mart following the stock market launch in Hong Kong on Friday, and now has a net worth of $3.2bn, according to Forbes.

Beijing-based Pop Mart raised $674m from the share sale, which it will use to open more stores and expand overseas. Its shares rose 100% higher in early trading after the stock market debut.

"Chinese are stressed over long hours but face low pay at work and unaffordable housing prices, so they look for cheap forms of entertainment and purchases," said Shaun Rein, managing director at China Market Research Group.

Pop Mart sells its products in 21 countries outside China and says its customers are mostly aged 18 to 35, while 75% are female.

"Young Chinese like cute items to decorate their desks and homes. The surprising nature of what one gets also excites consumers," Mr Rein added.

China's millennials spend more on mystery toys than any other hobby, including designer shoes and e-sports, according to a report from e-commerce platform Tmall, which is owned by Alibaba.

https://www.bbc.com/news/business-55269779

26. Who or what is Wang Ning?

    a. A mystery
    b. A company owner
    c. An enterprise
    d. A woman

27. What made Wang Ning a multi-billionaire?

    a. Pop Mart became a private company.
    b. People became able to buy shares in Pop Mart.
    c. The products only cost $8 each.
    d. His wealth surged.

28. What is NOT true about the toys?

    a. You can see what they are when you buy them.
    b. They are mostly bought by young ladies.
    c. They cost around $8 each.
    d. They form a collection.

29. What reason is NOT given as to why Chinese people buy these toys?

    a. They enjoy surprises.
    b. They consider the toys to be inexpensive.
    c. They like toys based on film characters.
    d. They adorn their surroundings with them.

30. What is the probable reason why "China's millennials spend more on mystery toys than any other hobby"?

    a. Designer shoes are no fun.
    b. Alibaba is very popular.
    c. Chinese people work long hours.
    d. Salaries are low and the toys are entertaining.

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.

31. 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

32. In paragraph 4, the word '... Responsible ...' is closest in meaning to:
    a. leading
    b. high ranking
    \ c. sensible and trustworthy
    d. management

33. 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

34. In paragraph 5, the Google engineer was ___X___ by the AI (Artificial Intelligence).
    a. bemused by
    c. wary of
    d. directed by
    \ d. rsuaded by

35. In the ar le, neural networks are compared to:
    \ a. cerebral pathways
    b. social networks
    c. social media
    d. nervous conditions

36. 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

37. 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.

38. 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.

39. 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.

40. 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

QCM Physique/Electronique – InfoS1

Pensez à bien lire les questions ET les réponses proposées

Pour l'ensemble des questions de physique, nous considèrerons un point M repéré par son vecteur position dans la base cartésienne $(\vec{u}_x; \vec{u}_y; \vec{u}_z)$:

$$\overrightarrow{OM} = x(t).\vec{u}_x + y(t).\vec{u}_y + z(t).\vec{u}_z$$

$$\overrightarrow{OM} = 3t.\vec{u}_x + (t^2 + 2t).\vec{u}_y + 0.\vec{u}_z$$

Q41.   L'équation de la trajectoire est :

    a. $y(t) = \frac{t^2}{9} + \frac{2t}{3}$

    b. $y(x) = \frac{x^2}{9} + \frac{2x}{3}$

    c. $y(x) = \frac{-x^2}{9} + \frac{2x}{3}$

    d. $y(x) = \frac{-x^2}{9} + \frac{-2x}{3}$

Q42.   Le vecteur vitesse s'écrit :

    a. $v(t) = 3.\vec{u}_x + (-2t + 2).\vec{u}_y$

    b. $\vec{v}(t) = 3.\vec{u}_x + (2t + 2)\vec{u}_y$

    c. $\vec{v}(t) = 3.\vec{u}_x + (-2t^2 + 2).\vec{u}_y$

    d. $\vec{v}(t) = 3.\vec{u}_x - 2t.\vec{u}_y$

Q43.   La norme du vecteur vitesse vaut :

    a. $\|\vec{v}(t)\| = \sqrt{41}$

    b. $\|\vec{v}(t)\| = \sqrt{9t^2 + (t^2 + 2t)^2}$

    c. $\|\vec{v}(t)\| = \sqrt{9 + (2t + 2)^2}$

    d. $\|\vec{v}(t)\| = \sqrt{3 + (2t + 2)^2}$

Q44.   Le vecteur accélération s'écrit :

    a. $\vec{a}(t) = \ddot{x}(t).\vec{u}_x + \ddot{y}(t).\vec{u}_y + \ddot{z}(t).\vec{u}_z$

    b. $\vec{a}(t) = \sqrt{\ddot{x}(t).\vec{u}_x + \ddot{y}(t).\vec{u}_y + \ddot{z}(t).\vec{u}_z}$

    c. $\vec{a}(t) = \sqrt{\ddot{x}(t).\vec{u}_x + \ddot{y}(t).\vec{u}_y + \ddot{z}(t).\vec{u}_z}$

    d. $\vec{a}(t) = \frac{dx}{dt}(t).\vec{u}_x + \frac{dy}{dt}(t).\vec{u}_y + \frac{dz}{dt}(t).\vec{u}_z$

Q45.   Un mouvement dont la trajectoire est circulaire peut s'écrire sous la forme :

    a. $x^2 + y^2 = R^2$

    b. $x^2 + y^2 = R$

   c. $x^2 + y^2 + z^2 = R^2$

    d. $x^2 = y^2$

12

Q46. Pour mesurer la tension aux bornes d'un générateur, on met le voltmètre :

  a. En série avant le générateur

  b. En parallèle avec le générateur

  c. En série après le générateur

  d. On ne peut pas mesurer la tension aux bornes d'un générateur

Q47. Une branche d'un circuit correspond à un ensemble de dipôles placés en série.

  a. VRAI   b. FAUX

Q48. L'intensité du courant qui entre dans une résistance est supérieure à l'intensité de celui qui en ressort.

  a- VRAI   b- FAUX

Q49. Si deux dipôles appartiennent à la même maille :

  a. on peut dire qu'ils sont en série

  b. on peut dire qu'ils sont en parallèle

  c. on ne peut rien dire

Q50. Soit le circuit ci-contre.

Si $R_1 = R_2 = R_3 = R_4 = R_5 = R_6 = R$, quelle est l'expression de la résistance équivalente vue par E ?

  a- $6R$ c- $\frac{12}{7}.R$

  b- $\frac{7}{13}.R$ d- $\frac{7}{12.R}$

13
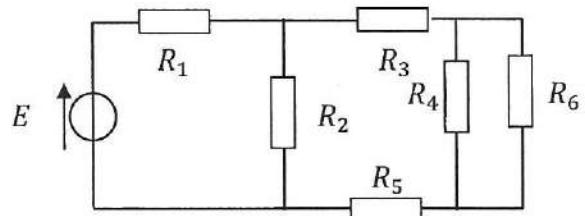
QCM 2
Architecture des ordinateurs

Lundi 10 octobre 2022

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

51. Combien de symboles différents possède la base 17 ?
  A. 17
  B. Aucune de ces réponses.
  C. 16
  D. La base 17 n'existe pas.

52. Quel est le poids du chiffre 3 dans le nombre suivant : 41320_8 ?
  A. 64
  B. Aucune de ces réponses.
  C. 8
  D. 3

53. Quel est le résultat de la soustraction suivante : $1000_{20} - 1_{20}$?
  A. Aucune de ces réponses.
  B. FFF_{20}
  C. JJJ_{20}
  D. $1FFF_{20}$

54. Quel nombre est égal à 2^{12} ?
  A. $2^{14} - 2^{13} - 2^{12}$
  B. 10000000000000_2
  C. Aucune de ces réponses.
  D. 2000_{16}

55. 1 Mio =
  A. 2^{20} bits
  B. Aucune de ces réponses.
  C. 2^{23} octets
  D. 1024 Kib

56. $153_5 =$
    A. 53_{10}
    B. 110101_2
    C. 10011001_2
    \ D. Aucune de ces réponses.

57. $9CD_{16} =$
    A. 4714_8
    \ B. 4715_8
    C. 4716_8
    D. Aucune de ces réponses.

58. $257_{10} =$
    A. 10000000_2
    B. 111111110_2
    \ C. 100000001_2
    D. Aucune de ces réponses.

59. $101011000110001110_2 =$
    \ A. $2B18E_{16}$
    B. $AC638_{16}$
    \ C. 530616_8
    D. Aucune de ces réponses.

60. $145_{10} =$
    A. 219_8
    B. 357_6
    C. 1_{145}
    \ D. Aucune de ces réponses.

15