ALGO
MCQ

1. **In the hashing principle, the position of an element is determined by?**
   (a) its own value
   (b) the value of its key
   (c) a function applied to its value
   (d) a function applied to its key

2. **Let x and y be two distinct elements such as $v = h(x) = h(y)$, we say that we have a?**
   (a) Collision between x and y at the slot v
   (b) Primary collision between x and y at the slot v
   (c) Secondary collision between x and y at the slot v
   (d) Single collision between x and y at the slot v

3. **A hashing function cannot be ?**
   (a) Determinist
   (b) Universal
   (c) Easy to compute
   (d) Fast to compute

4. **Is the separation a hashing method ?**
   (a) Yes
   (b) No
   (c) Sometimes

5. **Among the following methods, which ones are basic methods ?**
   (a) separation
   (b) exception
   (c) diagonalization
   (d) convolution
   (e) none of the above

6. **The basic hashing method that uses bit operators on sub-words is ?**
   (a) the completion
   (b) the compression
   (c) the extraction
   (d) the division

7. **A hashing function must be ?**
   (a) Determinist
   (b) Universal
   (c) Easy to compute
   (d) Fast to compute

8. **Which basic hashing method uses a real number lying between 0 and 1 ?**
   (a) the completion
   (b) the division
   (c) the multiplication
   (d) la separation

9. **The extraction, a basic hashing method, using certain bits of the representation ?**
   (a) gives excellent results
   (b) gives correct results
   (c) does not give good results

10. **The major drawback of the compression method is to hash ?**
    (a) systematically odd size words
    (b) identically permutations of the same word
    (c) systematically even size words
    (d) identically odd size words

2

MCQ n°1

Monday, October 2nd, 2017

Question 11

Let (u_n) be a positive real sequence such that for every $n \in \mathbb{N}^*$, $u_n \geqslant \frac{1}{n^2}$. Then

a. $\sum u_n$ is convergent

b. $\sum u_n$ is divergent

c. we cannot conclude anything about the nature of the series $\sum u_n$

Question 12

The series $\sum \frac{n}{\ln(n)}$

a. converges

b. diverges

c. neither of the above

Question 13

Let $\sum u_n$ be a convergent series. Then

a. (u_n) converges

b. (u_n) necessarily converges towards 0

c. (u_n) may be divergent

d. none of the above

Question 14

Let (u_n) be a positive real sequence such that $\sqrt{n}\,u_n \xrightarrow[n\to+\infty]{} 0$. Then

a. $\sum u_n$ is convergent

b. $\sum u_n$ is divergent

c. we cannot conclude anything about the nature of the series $\sum u_n$

Question 15

Let $\alpha \in \mathbb{R}$. Then $\sum \frac{1}{n^\alpha}$

a. converges iff $\alpha > 1$

b. converges iff $\alpha < 1$

c. converges iff $\alpha < -1$

d. converges iff $\alpha > -1$

e. diverges for every α

Question 16

In the neighbourhood of 0 :

a. $\ln(1+2x) = x - \frac{x^2}{2} + o(x^2)$

b. $\ln(1+2x) = 1 - x + \frac{x^2}{2} + o(x^2)$

c. $\ln(1+2x) = 2x - x^2 + o(x^2)$

d. $\ln(1+2x) = 2x - 2x^2 + o(x^2)$

e. none of the above

Question 17

In the neighbourhood of 0 :

a. $\cos(x)e^x = 1 + x + x^2 + o(x^2)$

b. $\cos(x)e^x = 1 + x + o(x^2)$

c. $\cos(x)e^x = 1 + x - x^2 + o(x^2)$

d. $\cos(x)e^x = 1 + x + o(x)$

e. none of the above

Question 18

In the neighbourhood of 0 :

a. $\sqrt{1+x} = 1 - \frac{1}{2}x + \frac{1}{4}x^2 + o(x^2)$

b. $\sqrt{1+x} = 1 + \frac{1}{2}x - \frac{1}{4}x^2 + o(x^2)$

c. $\sqrt{1+x} = 1 + \frac{1}{2}x - \frac{1}{8}x^2 + o(x^2)$

d. $\sqrt{1+x} = 1 - \frac{1}{2}x + \frac{1}{8}x^2 + o(x^2)$

e. none of the above

Question 19

In the neighbourhood of 0 :

a. $\sin(-x) = 1 - \frac{x^2}{2} + \frac{x^4}{4} + o(x^4)$

b. $\sin(-x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} + o(x^4)$

c. $\sin(-x) = x - \frac{x^3}{3} + \frac{x^5}{5} + o(x^5)$

d. $\sin(-x) = -x - \frac{x^3}{3!} - \frac{x^5}{5!} + o(x^5)$

e. none of the above

Question 20

In the neighbourhood of 0 :

a. $e^x = 1 + x + \frac{x^2}{2} + \frac{x^3}{3} + o(x^3)$

b. $e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + o(x^3)$

c. $e^x = 1 - x + \frac{x^2}{2} - \frac{x^3}{3} + o(x^3)$

d. $e^x = 1 - x + \frac{x^2}{2!} - \frac{x^3}{3!} + o(x^3)$

e. none of the above

5

QCM Azar Chap 1 (Overview tenses WB prac1-6) Choose the appropriate response.

21. What do you do every day before you come to class?
    a. I have eaten breakfast.
    b. I am eating breakfast.
    c. I eat breakfast.
    d. I've taken the bus.

22. What did you do last night?
    a. I have eaten dinner.
    b. I wrote some email and checked Facebook.
    c. I was watching TV.
    d. I had gone out with some friends.

23. What is the boss doing right now?
    a. He's been talking to the sales manager.
    b. He's having his hair cut.
    c. He trains the new secretary.
    d. A and B.

24. Where were you at this exact time yesterday? And what activity was in progress then?
    a. At a bookstore. I was looking for the books I needed to buy for this class.
    b. At a café. I read the book I bought for this class.
    c. At a diner. I was having lunch.
    d. A and C.

25. How many questions has the teacher asked since she began this exercise?
    a. I think she has asked 5 questions since we began this exercise.
    b. I think she asked 5 questions since we began this exercise.
    c. I think I was asked 5 questions since we began this exercise.
    d. I think she had asked 5 questions since we began this exercise.

26. Why is the beach closed today?
    a. There are sharks in the water. They swim near the shore.
    b. There are sharks in the water. They have swum near the shore.
    c. There are sharks in the water. They are swimming near the shore.
    d. There are sharks in the water. They swam near the shore.

27. Rupsha, hello! I ___ of you just a minute ago when the phone rang.
    a. have been thinking
    b. was thinking
    c. thought
    d. am thinking

28. John doesn't want to go because he __ the movie twice.
    a. has already seen
    b. had already seen
    c. already saw
    d. A and B.

29. Johan is watching the movie. It started 5 minutes ago so...
    a. Johan has watched the movie for five minutes.
    b. Johan has been watched the movie for five minutes.
    c. Johan has been watching the movie for five minutes.
    d. A and C.

30. "We have been watching TV all night." This sentence means...
    a. We are still watching TV.
    b. We watched TV until a little while ago.
    c. We have stopped watching TV.
    d. We want to stop watching TV now.

Tech solutions for refugees with Techfugees

By Aline Mayard March 17, 2016

1. As the migrant crisis has spread across Europe consciences have been awoken. What if technology could improve the life of migrants and asylum seekers? This is a question tech-optimists across Europe have been asking themselves. At Techfugees, entrepreneurs, refugees and civil society players team up to find solutions to the migrant crises. The latest gathering of tech minds asking this question was in Paris, all looking to help refugees in their path to integration. The hackathon hosted over 150 people from March 12 to 13, at the coding school Le Wagon, organized with the support of Facebook group Techfugees. Since being launched by Mike Butcher, TechCrunch's editor-at large in September 2015, the group has met so much success that it has now become an association organizing events from London to Sydney, including three hackathons. "Techfugees believes that technology can bring significant firepower because it scales," Techfugees' Joséphine Goube told Wamda: "The problem we are faced with right now involves a high volume of people, at a fast rate needing similar things: access to education, information etc."

2. While this was the first Techfugees event in France, this kind of event wasn't a first for France. Singa, an association that works toward the integration of asylum seekers and refugees, and co-organizer of this event, held a hackathon last year. For Guillaume Capelle, co-founder of Singa, it's a sign that this whole mediatization is bearing its fruits.

3. Over the course of the weekend, 11 projects were developed, from an online media platform for refugees, to a smart food platform that allows users to donate food that can then be ordered by refugees. The jury, which included representatives of Google, NUMA, and the UN, rewarded four projects. Taking first place was Textfugees, a tool that would allow NGOs and associations to automatically broadcast SMS's to refugees. Their prize will be incubation at Singa and will take part in the upcoming Techfugees international event. In second place E-migreats developed a community portal enabling refugees to exchange services. In joint third were Refugenious who wanted to create a matching platform between refugees and employers, and All Around offered a platform allowing refugees to localize resources and ask questions to help their situations.

4. Contrary to popular belief, Syrians only represent part of the asylum seeker numbers coming to France, and Europe as a whole. Afghans, Somalis, Iraqis, Sudanese, Eritreans, Pakistanis make the most of the bulk. Few freshly arrived refugees speak French. Some speak English, but most only speak their mother tongue - Arabic - but there is also Dari, Tigrina and Ourdou.

5. Over the hackathon weekend, project holders almost all deployed their solutions in French, English, and Arabic. But this wasn't enough and several teams chose to develop solutions enabling migrants to understand, and be understood. As an example, Syrians are known for being connected to internet via smartphones, however, this isn't the case for refugees coming from Africa, for example. This led many of the project holders to develop SMS solutions rather than internet websites or apps.

In the coming months Techfugees is looking to plan more hackathons, and this time closer to refugee hotspots like Lesbos or the Balkans.

7

QCM English OC S2-1

The first 9 questions are about the previous article.

31) In Paragraph 1, becoming an association that organizes events will...
   a) give entrepreneurs, refugees and players opportunity to work together.
   b) bring like-minded people together.
   c) allow an increasing number of immigrants and refugees access to education and resources.
   d) All of the above

32) In paragraph 2, media stories about the current refugee crisis are...
   a) having a positive impact.
   b) increasing people's suspicion of refugees.
   c) creating problems for asylum seekers.
   d) All of the above

33) In paragraph 3, the projects which won awards are all...
   a) text-based solutions.
   b) information-providing systems.
   c) GPS-based platforms.
   d) None of the above

34) Also in paragraph 3, the judges of the competition chose humanitarian tech-solutions by which refugees can...
   a) manually receive SMS's but also exchange their services.
   b) search for work but also exchange their services.
   c) find resources globally but also exchange their services.
   d) None of the above

35) In paragraph 3 again, how are the big organizations helping?
   a) They are giving financial aid.
   b) They are sending their personnel.
   c) They are offering to host the project.
   d) None of the above

36) In paragraph 4, the information about nationalities suggests that...
   a) it is only Syrians who are seeking asylum.
   b) all the new arrivals already speak French.
   c) English is the common language that refugees speak.
   d) None of the above

37) In paragraph 5, during the weekend...
   a) all talks were delivered in French, English and Arabic.
   b) both African and Syrian groups of migrants use smartphones.
   c) each migrant group uses a different type of tech solution.
   d) All of the above

38) What next steps will the Techfugee project be taking?
   a) They'll be inviting more refugees to France.
   b) They'll be scaling-back the meet-ups.
   c) They'll be going to the places where the groups of refugees already are.
   d) None of the above

39) The date shows that the article _____ published over a year ago.
   a) will be
   b) is being
   c) was
   d) had

40) _____ Techfugees started as an organization the team has set-up in at least 22 cities.
   a) Although
   b) However
   c) Whether
   d) Since

QCM English OC S2-1

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   c) Whether
   d) Since

M.C.Q. n°1 of Physics

41- Let's consider two pointlike charges q_1 and q_2 which are separated by a distance r. The electric force which describes the interaction between them is

a) proportional to the product of masses m_1 and m_2 of the charges
b) the most relevant amongst forces on atomic scale
c) inversely proportional to the charge product
d) inversely proportional to r

42- Electric force $\vec{F}_e$ is

a) attractive for any kind of charges
b) attractive or repulsive according to the sign of charges
c) repulsive for any kind of charges

43- The electrostatic field $\vec{E}(M)$ created by an electron is

a) divergent towards infinite
b) maximal at infinite distance
c) convergent towards the charge

44- The electric field lines which are generated by a charge q are

a) circles
b) ellipses
c) straight lines

45- An electrostatic field $\vec{E}$ is divergent if it is created by:

a) a proton
b) a neutron
c) an electron

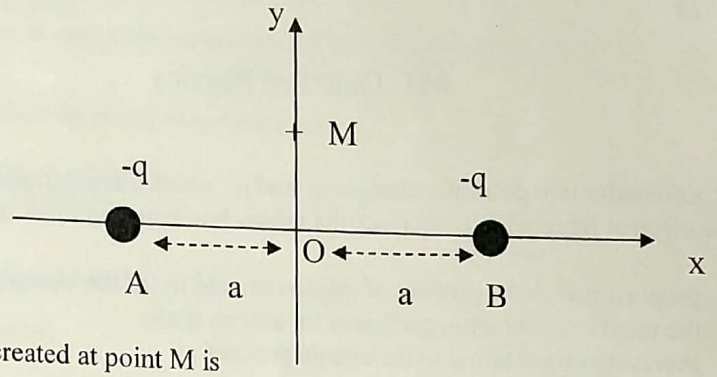
46- The electrostatic field $\vec{E}$ generated at point M by a charge which is located at same point M is:

a) convergent
b) null
c) undefined

47- The intensity of the electrostatic field that is created at point M by a charge q_A, located at point A, reads:

a) $E_A(M) = k\dfrac{|q_A|}{(AM)^2}$ b) $E_A(M) = k\dfrac{|q_A||q_M|}{(AM)^2}$ c) $E_A(M) = k\dfrac{|q_A|}{AM}$

48- Let's consider the following charge distribution:



The electric field created at point M is

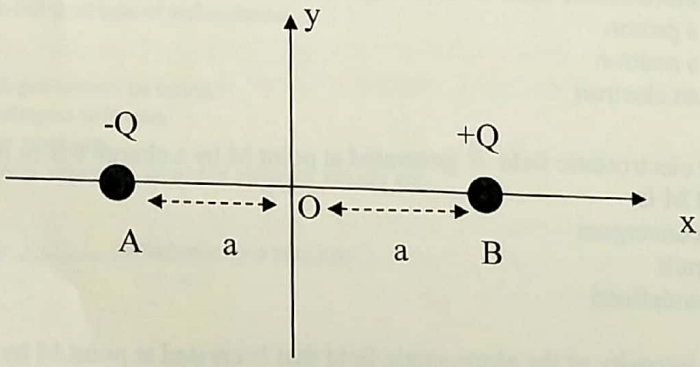
a) vanishing
b) along (Oy) axis pointing towards $y > 0$
c) along (Oy) axis pointing towards $y < 0$
d) orthogonal to (Oy) axis

49- The norm of the electric field which is created at point M as sketched above in question 48 is given by:

a) $E(M) = \frac{kq}{(AM)^2}\cos(\alpha)$ b) $E(M) = \frac{2kq}{(AM)^2}\cos(\alpha)$ c) $E(M) = \frac{2kq}{(AM)^2}\sin(\alpha)$

(Where α = angle (MA, MO))

50- Let's consider dipole (-Q, +Q) as drawn below:



The electric field at point O is

a) collinear to (AB), with orientation from A to B
b) collinear to (AB), with orientation from B to A
c) orthogonal to (AB), pointing towards $y > 0$
d) orthogonal to (AB), pointing towards $y < 0$

10

Electronics MCQ – InfoS3

Read carefully the questions AND the suggested answers (beware of answer numbering)

Review: Electronics laws and theorems

Q1. If two resistances R_1 and R_2 are in series which quantity is conserved?

a- Voltage at R_1's terminals

b- Current flowing through R_1

c- None

Q2. An opened switch is such that:

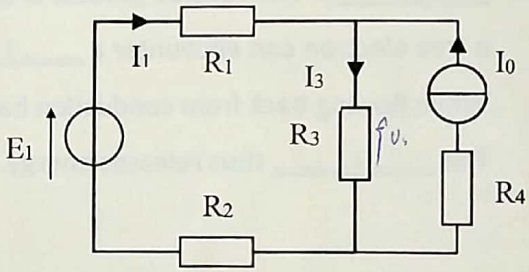
a- some infinite current flows through it

b- some vanishing voltage can be measured at its terminals

c- some infinite voltage can be measured at its terminals

d- none of these answers is true

Let's consider the following circuit:



Q3. We want to determine the tension U_3 at R_3's terminals.

a- $U_3 = \left(\frac{E_1}{R_1+R_2} + I_0\right)$

b- $U_3 = E_1$

c- $U_3 = R_4 . I_0$

d- $U_3 = R_3 . \frac{E_1+(R_1+R_2).I_0}{R_1+R_2+R_3}$

Q4. Thévenin's resistance R_{th} measured by R_1 is:

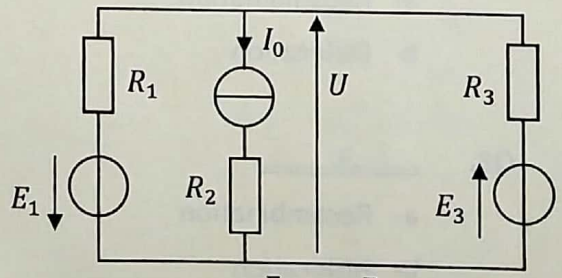
a- $R_{th} = R_2 + R_3 + R_4$

b- $R_{th} = R_2 + \frac{R_3.R_4}{R_3+R_4}$

c- $R_{th} = R_3 + R_2$

d- $R_{th} = \frac{R_4.(R_1+R_2)}{R_4+R_1+R_2} + R_3$

Q5. Which of the following answers is correct?



a. $U = \frac{\frac{E_1}{R_1}+\frac{E_3}{R_3}}{\frac{1}{R_1}+\frac{1}{R_2}+\frac{1}{R_3}}$

b. $U = \frac{\frac{E_1}{R_1}+I_0-\frac{E_3}{R_3}}{\frac{1}{R_1}+\frac{1}{R_2}+\frac{1}{R_3}}$

c. $U = \frac{\frac{E_3}{R_3}-I_0-\frac{E_1}{R_1}}{\frac{1}{R_1}+\frac{1}{R_2}+\frac{1}{R_3}}$

d. $U = \frac{-\frac{E_1}{R_1}-I_0+\frac{E_3}{R_3}}{\frac{1}{R_1}+\frac{1}{R_3}}$

Semiconductors and diodes

Let's consider a piece of pure Silicium cristal.

At T = 0K any atom of the cristal is bound to neighbouring atoms with 4 covalent bounds.

At T ≠ 0K some electrons in valence band flow into conduction band and thus some covalent bounds disappear. Absence of a valence band electron in a covalent bound is equivalent to existence of a .....1..... whose charge has the same absolute value than the electron one but the hole charge is positive. The number of free electrons is always equal to the number of .....1..... The higher the temperature is, the larger this number is.

Creation process of electron/.....1..... pairs in a semiconductor is the so-called .....2..... The reverse process is the .....3..... Indeed, during its chaotic motion a free electron can encounter a .....1..... and so can create a former covalent bound. While flowing back from conduction band to valence band the electron energy decreases. The .....3..... thus releases energy.

You must obviously find the correct word to fill out the text:

Q6. .....1.....

a- Hole
b- Charge
c- Valence electron
d- None of these answers

Q7. .....2.....

a- Recombination
b- Dislocation
c- Thermal generation
d- None of these answers

Q8. .....3.....

a- Recombination
b- Dislocation
c- Thermal generation
d- None of these answers

Q9. Doping decreases the semiconductor conductivity.

a- TRUE
b- FALSE

12

Q10. One uses the semiconducting element Silicium which has 4 electrons in its valence band. If one dopes it with phosphorus, an element with 3 electrons in its valence band, which kind of doping do we get:

a- Doping P

b- Doping N

c- Doping NP

d- No doping

13

Test 1
Computer Architecture

Monday 2nd October 2017

11. The 68000 has:
    A. 4 data registers
    B. 8 data registers
    C. 16 data registers
    D. 32 data registers

12. A data register is:
    A. 8 bits wide
    B. 16 bits wide
    C. 24 bits wide
    D. 32 bits wide

13. The data bus of the 68000 is:
    A. 8 bits wide
    B. 16 bits wide
    C. 24 bits wide
    D. 32 bits wide

14. Which are the privilege modes of the 68000 (two answers)?
    A. The kernel mode
    B. The supervisor mode
    C. The user mode
    D. The beginner mode

15. Which mode is used by operating systems?
    A. The kernel mode
    B. The supervisor mode
    C. The user mode
    D. The beginner mode

14

16. The N flag is set to 1 when:
    A. A signed overflow occurs.
    B. An unsigned overflow occurs.
    C. A result is positive.
    D. A result is negative.

17. The C flag is set to 1 when:
    A. A signed overflow occurs.
    B. An unsigned overflow occurs.
    C. A result is positive.
    D. A result is negative.

18. The 68000 has:
    A. 1 PC register
    B. 2 PC registers
    C. 4 PC registers
    D. 8 PC registers

19. The 68000 has:
    A. 1 stack pointer
    B. 2 stack pointers
    C. 4 stack pointers
    D. 8 stack pointers

20. Which mnemonic is not an assembler directive?
    A. EQU
    B. DC
    C. ORG
    D. ILLEGAL

15

CORRIGÉ QCM S3 02/10/2017

ALGO	
1	D
2	B
3	B
4	B
5	E
6	B
7	ACD
8	C
9	C
10	B

MATH	
11	C
12	B
13	AB
14	C
15	A
16	D
17	BD
18	C
19	E
20	B

ANGLAIS	
21	C
22	B
23	B
24	D
25	A
26	C
27	B
28	A
29	C
30	A

OC	
31	D
32	A
33	D
34	B
35	B
36	D
37	C
38	C
39	C
40	D

PHYSIQUE	
41	B
42	B
43	C
44	C
45	A
46	C
47	A
48	C
49	B
50	B

ELEC	
1	B
2	D
3	D
4	C
5	D
6	A
7	C
8	A
9	B
10	A

ARCHI	
11	B
12	D
13	B
14	BC
15	B
16	D
17	B
18	A
19	B
20	D