Answer the following questions

Q1) what is the difference between cybercrime and cybersecurity?

Q2) compare between cybersecurity, information security and software security

Q3) state the type of CIA of the next examples

1-Criminal steals, customers' usernames, passwords, or credit card information

2-DOS

3-Your customers are unable to access your online services

4-Someone alters payroll information or a proposed product design

Q4) state 3 types of malwares and the difference between them

Q5) What makes a vulnerability a zero-day?

Choose the correct answer [40 Marks]:

1) In which of the following, a person is constantly followed/chased by another person or group of several peoples?
a-Phishing b.Bulling c.Stalking d.Identity theft

2) _____ is a type of software designed to help the user's computer detect viruses and avoid them.
a-Malware b-Adware c-Antivirus d-Both B and C

3) It can be a software program or a hardware device that filters all data packets coming through the internet, a network, etc. it is known as the_____:
a-Antivirus b-Firewall c-Cookies d-Malware

4) Which of the following refers to the violation of the principle if a computer is no more accessible?
a-Access control b-Confidentiality c-Availability d-All of the above

5) Which of the following can be considered as the elements of cyber security?
a.Application Security b.Operational Security c.Network Security d.All

6) Which of the following are famous and common cyber-attacks used by hackers to infiltrate the user's system?
a-DDos and Derive-by Downloads b-Malware & Malvertising
b-Phishing and Password attacks c-All of the above

7) Hackers usually used the computer virus for _____ purpose.
a. To log, monitor each and every user's stroke
b. To gain access the sensitive information like user's Id and Passwords
c. To fix the user's data stored in the computer system
d. a and b

8) In Wi-Fi Security, which of the following protocol is more secured to be used?
a. WPA b-WPA2 c-WPS d-Both A and C

9) Which type of the following malware does not replicate or clone them self's through infection?
a. Rootkits b-Trojans c-Worms d-Viruses

10) Which of the following statements is true about the Trojans?
a. Trojans perform tasks for which they are designed or programmed
b. Trojans replicates them self's or clone them self's through an infections
c. Trojans do nothing harmful to the user's computer systems
d. None of the above

11) Which of the following is an example of a strong password?
a) "123456" b) "Password123" c) "P@$$w0rd" d) "abc123"

12) Which of the following is NOT an example of a common social engineering attack?
a) Phishing b) Malware c) Shoulder surfing d) Tailgating

13) What is the purpose of a firewall in network security?
a) Encrypting data transmission b) Preventing unauthorized access
c) Detecting and removing malware d) Backing up data automatically

14) What is the purpose of penetration testing in cybersecurity?
a) Developing secure coding practices b) Identifying vulnerabilities in a system
c) Encrypting sensitive data d) Removing malware infections

15) What is the best practice for handling phishing emails?
a) Reply to the email and provide the requested information
b) Click on the provided links to verify the authenticity
c) Delete the email and do not interact with it d) Forward the email to all contacts to warn them

16) What is the primary purpose of a botnet?
a) Sending spam emails b) Mining cryptocurrency
c) Conducting distributed denial-of-service (DDoS) attacks d) Spreading ransomware

17) What is ransomware?
a) Malware that steals sensitive information b) Malware that spreads through infected email attachments
c) Malware that encrypts files and demands a ransom for decryption
d) Malware that records keystrokes and captures login credentials
18) Which of the following is NOT a common distribution method for malware?
a) Drive-by downloads b) Phishing emails
c) Software updates from trusted sources d) Social media advertisements
19) What is a keylogger?
a) Malware that steals credit card information b) Malware that records and captures keystrokes
c) Malware that deletes system files d) Malware that modifies system settings
20) What is a zero-day vulnerability?
a) A vulnerability that has existed for zero days
b) A vulnerability that has been exploited by zero attackers
c) A vulnerability that has not yet been discovered or patched
d) A vulnerability that affects zero systems
21) What is the primary goal of malware analysis?
a) To identify and understand the behavior of malicious software
b) To develop new types of malware for offensive purposes
c) To detect and remove malware from infected systems
d) To perform penetration testing on network defenses
22) How can AI technologies contribute to preventing cyber attacks?
a) By completely eliminating the need for cybersecurity professionals
b) By automatically patching vulnerabilities in software systems
c) By detecting and mitigating threats in real-time d) By creating impenetrable firewalls
23) How can AI-powered anomaly detection systems help prevent cyber attacks?
a) By automatically launching counterattacks against malicious actors
b) By analyzing patterns of normal behavior and identifying deviations
c) By encrypting data to prevent unauthorized access
d) By automatically updating antivirus signatures in real-time
24) Which of the following is true about the benefits of using AI for threat intelligence analysis?
a) Rapidly identifying and responding to zero-day vulnerabilities
b) Automatically blocking all incoming network traffic to prevent attacks
c) Predicting future cyber attack trends with 100% accuracy
d) Encrypting sensitive data to protect against unauthorized access
25) How does AI-based phishing detection work?
a) It uses AI algorithms to automatically generate phishing emails for testing purposes
b) It analyzes email content and metadata to identify suspicious patterns
c) It encrypts email attachments to prevent unauthorized access
d) It deploys AI chatbots to interact with potential phishing attackers
26) What is a SQL injection attack?
a) Exploiting vulnerabilities in a web application's database layer to execute unauthorized SQL commands
b) Intercepting and manipulating network traffic to gain unauthorized access to a web server
c) Sending a large volume of requests to overwhelm a web server and cause it to become unresponsive
d) Tricking users into providing sensitive information through deceptive websites or emails
27) What is a cross-site scripting (XSS) attack?
a) Manipulating a website's code to redirect users to a malicious website
b) Extracting sensitive information from a web server by exploiting misconfigured security settings
c) Injecting malicious scripts into web pages viewed by unsuspecting users
d) Impersonating a legitimate website to steal login credentials from users
28) What is a man-in-the-middle (MITM) attack?
a) Manipulating a website's code to redirect users to a malicious website
b) Intercepting and eavesdropping on network traffic to steal sensitive information
c) Injecting malicious scripts into web pages viewed by unsuspecting users

d) Impersonating a legitimate website to steal login credentials from users

29) What is a session hijacking attack?

a) Intercepting and eavesdropping on network traffic to steal sensitive information
b) Manipulating a website's code to redirect users to a malicious website
c) Exploiting vulnerabilities in a web application's session management to impersonate an authenticated user
d) Tricking users into providing sensitive information through deceptive websites or emails

30) Which of the follwing is trueabout the difference between a vulnerability and an exploit?

a) Vulnerability refers to a weakness in a system, while an exploit is a tool used to leverage that weakness
b) Vulnerability refers to a software bug, while an exploit refers to a hardware vulnerability
c) Vulnerability refers to a physical security flaw, while an exploit refers to a software vulnerability
d) Vulnerability and exploit are interchangeable terms referring to the same concept

31) What is the concept of "defense in depth" in cybersecurity?

a) Implementing multiple layers of security controls to protect against various types of threats
b) Encrypting data using complex cryptographic algorithms
c) Conducting regular vulnerability assessments to identify system weaknesses
d) Monitoring and analyzing network traffic for potential security incidents

32) What is the concept of "defense in depth" in cybersecurity?

a) Implementing multiple layers of security controls to protect against various types of threats
b) Encrypting data using complex cryptographic algorithms
c) Conducting regular vulnerability assessments to identify system weaknesses
d) Monitoring and analyzing network traffic for potential security incidents

33) What is social engineering in the context of cybersecurity?

a) Exploiting vulnerabilities in a network's social media profiles
b) Manipulating individuals to gain unauthorized access to sensitive information
c) Creating secure social media platforms to protect user privacy
d) Developing algorithms to analyze social media trends for cybersecurity purposes

34) What is the principle of "least privilege" in cybersecurity?

a) Restricting user access rights to only the resources necessary to perform their tasks
b) Granting users unlimited privileges for administrative tasks
c) Providing users with access to all system resources for ease of use
d) Implementing encryption algorithms with the lowest possible key length

35) which of the following is not true about cyber security?

a) Cyber Security provides security against malware
b) Cyber Security provides security against cyber-terrorists
c) Cyber Security protects a system from failure d)all

36) **Which of the following is a type of cyber security?**

a) Cloud Security b) Network Security c) Application Security d) All

37) **Which of the following is not a cybercrime?**

a) Denial of Service b) Man in the Middle c) Malware d) CIA

38) **Which of the following is NOT a type of cyber attack?**

a) Phishing b) SQL Injections c) cookies d)Password Attack

39) According to the CIA Triad, which of the below-mentioned elements is not considered in the triad?

a) Confidentiality b) Integrity c) Authenticity d) Availability

40) When you use the word _____ it means you are protecting your data from getting disclosed.

a) Confidentiality b) Integrity c) Authentication d) Availability

Q2) Answer the following questions [20 Marks]

1) State the type of CIA of the next examples

A. Criminal steals, customers' usernames, passwords, or credit card information
B. DOS
C. Your customers are unable to access your online services
D. Someone alters payroll information or a proposed product design

2) Give 3 ways for applying DDOS aatack by usig mailware?

3)How to protect yourself from cyberattacks?

4)Choose the correct answer with explaining

A. Scenario: An online store allows users to search for products by entering a keyword. The SQL query used to fetch the products is:

SQL code

```
SELECT * FROM products WHERE name LIKE '%<keyword>%'
```

Which of the following SQL injection attacks would allow an attacker to retrieve all product records from the database? Explain your choice

a) keyword = ' OR 1=1 –'
b) keyword = '; DELETE FROM products; --'
c) keyword = ' UNION SELECT * FROM users; --
d) keyword = ' AND 1=1 –

B. Scenario: A login form on a website validates user credentials using the following SQL query:

SQL code

```
SELECT * FROM users WHERE username = '<username>' AND password = '<password>'
```

Which of the following SQL injection attacks would allow an attacker to bypass the authentication and log in without a valid password? Explain your choice
a) username = 'admin'—'
b) username = 'admin' OR '1'='1' –'
c) username = '' OR 1=1; SELECT * FROM users; --'
d) username = 'admin' AND password LIKE '%'

C. Scenario: A web application inserts user comments into a database using the following SQL query:

SQL code

```
INSERT INTO comments (name, comment) VALUES ('<name>', '<comment>')
```

Which of the following SQL injection attacks would allow an attacker to delete the entire "comments" table from the database? Explain your choice
a) comment = '); DELETE FROM comments; --
b) comment = ' OR 1=1 --
c) comment = ' UNION SELECT * FROM users; --
d) comment = ' DROP TABLE comments; --

Level: 3
Course Title: Theory of Computation
Course Code: CS 432
Date: 11- 6 - 2023

Model 1

Arab republic of Egypt
Ministry of Higher Education
Tanta University
Faculty of Computers and Information Science

Final Exam – 2nd Term 2022/2023	**Total Assessment Marks: 60**

Choose the correct answer among the choices (only one answer for each question)

1. **Which of the following can use Empty String transition?**

   a. FA b. NFA c. DFA d. All of the above

2. **Which strings are valid for Regular Expression aa(bb)***
   a. bb, bbbb, bbbbbb,… b. abb, abbbb, abbbbbb,…
   c. aabb, aabbbb, aabbb,… d. aabb, aabbbb, aabbbbbb,…

3. **L1= {w | w does not contain the string 01 } & L2 = {w | w does contain the string 01}**
   Given ∑ = {0, 1}, The difference of the minimum number of states required to form L1 and L2?
   a. 0 b. 1 c. 2 d. None of the above

4. **If you consider a regular expression R, in which R = (11 + 111)* over Σ = {0, 1}, then the number of states in minimal DFA and NFA respectively are:**
   a. DFA – 4, NFA – 3 b. DFA – 3, NFA – 3
   c. DFA – 3, NFA – 4 d. DFA – 4, NFA – 4

5. **For any DFA state $\{q_i,q_j…q_m\}$ If some q_j is a final state in the NFA Then $\{q_i,q_j…q_m\}$, is a final state in the DFA.**
   a. True b. False

6. **There are ……. Tuples in finite state machine.**
   a. 4 b. 5 c. 6 d. None of the above.

7. **Number of states require to accept string end with 01 is ……..**
   a. 1 b. 2 c. 3 d. None of the above.

8. **Regular expression for all strings starts with ab and ends with bba is……..**
   a. ab (a+b) a b. ab(a+b)* b c. ab a* b* ba d. ab (a+b)* bba

9. **The number of states in the minimal DFA corresponding to the regular expression (0 + 1)* (10) is……**
   a. 4 b. 3 c. 6 d. None of the above

10. **Given Language: L= {ab U aba}***
    If X is the minimum number of states for a DFA and Y is the number of states to construct the NFA, |X-Y|=?
    a. 1 b. 2 c. 3 d. 4

11. **If R_1 and R_2 are two regular expressions then expression R_1 U R_2 is……..**
    a. Regular expressions b. Regular language
    c. Concatenation d. None of the above

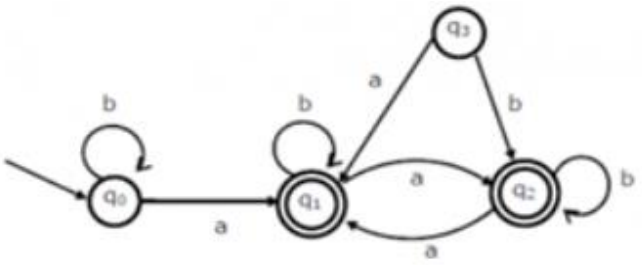
12. Every NFA accepts a……..

a. String b. Regular language c. Function d. None of the above

13. The language accepted by this DFA is

a. b*ab*ab*ab* b. (a+b)*

c. b*a(a+b)* d. b*ab*ab*



14. Which of the following is a not a part of 5-tuple finite automata?

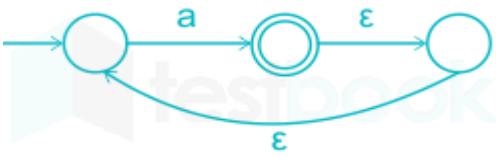
a. Initial State b. Transition function

c. Output Alphabet d. None of the above

15. What is the complement of the language accepted by the NFA shown below?
Assume Σ = {a} and Ɛ is empty string

a. { Ɛ } b. ϕ

c. a* d. (a, Ɛ)



16. The language of all words with at least 2 a's can be described by the regular expression

a. (ab)*a and a (ba)* b. (a + b)* ab* a (a + b)*

c. b* ab* a (a + b)* d. All of the above

17. A language is represented by a regular expression (a)*(a + ba). Which of the following string does not belong to the regular set represented by the above expression.

a. aaa b. aba c. ababa d. aa

18. The regular languages can have one or more of the following descriptions:
i. DFA ii. NFA iii. Regular Expressions. Which of the following are correct?

a. i, ii only b. i, iii only

c. ii, iii only d. i, ii, iii

19. Which one of the following languages over the alphabet {0,1} is described by the regular expression: (0+1)* 0 (0+1)* 0 (0+1)* ?

a. The set of all strings containing the substring 00.

b. The set of all strings containing at most two 0's.

c. The set of all strings containing at least two 0's.

d. The set of all strings that begin and end with either 0 or 1.

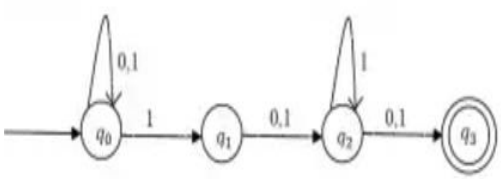
20. Regular expressions are closed under

a. Union b. complement c. Concatenation d. All of the above

21. Consider the finite automaton in the following figure.
What is the set of reachable states for the input string 0011?

a. q_0, q_1, q_2 b. q_0, q_1

c. q_0, q_1, q_2, q_3 d. q_1, q_3



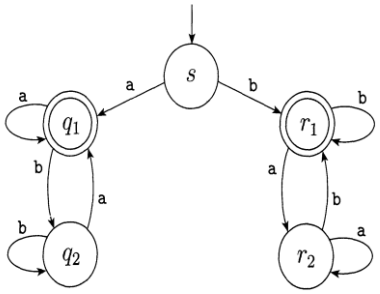
22. Let L_1 = {ab, abb} and L_2 = {ba, baa}. *What is the concatenation (L_1L_2)* of L_1 and L_2?

a. L_1L_2 = { Ɛ , abba, abbaa, abbba} *b. L_1L_2 = { ab, abb, ba, baa}*

c. L_1L_2 = { abba, abbaa, abbba, abbbaa} *d. L_1L_2 = { baab, baa, bab, ba}*

23. The DFA shown in Figure describes the following language:

a. Every string starts and ends with the same letter
b. Every string starts and ends with a different letter
c. Every string contains only a's or b's but not both
d. None of the above

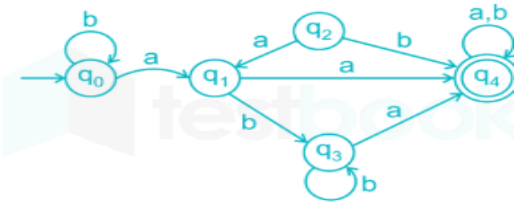


24. Express the language *L(r)* defined by the regular expression r = a* (a Ub) in a set notation.

a. L(r) = { Ɛ, a, aa, aaa, …, b ,ab, aab, …}
b. L(r) = {a, aa, aaa, …, b, ab, aab, …}
c. L(r) = { Ɛ, a, aa, aaa, …, b, ba, baa, …}
d. L(r) = {a, b, aa, ab, ba, bb, aaa, aab, aba, baa, bba, abb, bab, bbb, … }

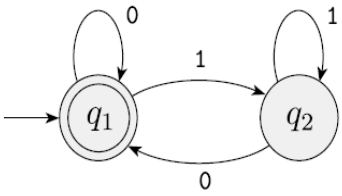
25. Consider the following DFA. What is the number of states obtained after minimizing the given DFA?

a. 1 b. 2
c. 3 d. 4



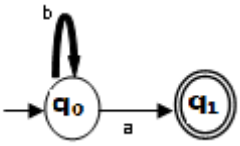
26. For the language L defined by the DFA in the following Figure, L accepts:

a. All strings on Σ = {0,1} that end with 1
b. All strings on Σ = {0,1} that end with 0
c. All strings on Σ = {0,1} that end with 0 and empty string
d. None of the above



27. For the machine M shown in the following Figure, the transition function δ is given by:

a. $\delta(q_0, a) = q_0, \delta(q_0, b) = q_1, \delta(q_1, a) = \Phi, \delta(q_1, b) = \Phi$
b. $\delta(q_0, a) = q_1, \delta(q_0, b) = q_0, \delta(q_1, a) = \mathcal{E}, \delta(q_1, b) = \mathcal{E}$
c. $\delta(q_0, a) = q_1, \delta(q_0, b) = q_0, \delta(q_1, a) = q_1, \delta(q_1, b) = q_1$
d. $\delta(q_0, a) = q_1, \delta(q_0, b) = q_0, \delta(q_1, a) = \Phi, \delta(q_1, b) = \Phi$

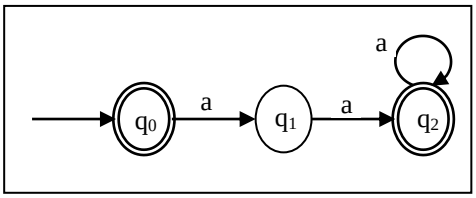


28. The regular expression of the language accepted by the machine shown in the above question is:

a. $b^* a \cup a^* b$ b. $b a^*$ c. $a^* b$ d. $b^* a$

29. The language over *∑ = { a }* represented by the DFA in following Figure is:

a. $L = \{ a^n : n >= 0 \}$ b. $L = \{ a^n : n >= 2 \}$
c. $L = \{ a^n : n >= 0, n \neq 2\}$ d. $L = \{ a^n : n >= 0, n \neq 1 \}$

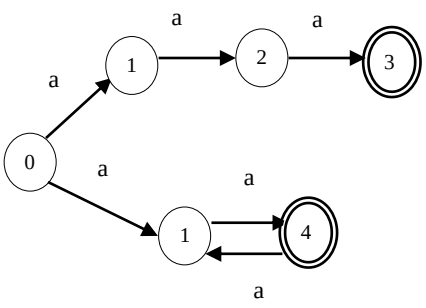


30. The machine M shown in above question is called:

a. NFA b. DFA
c. Neither NFA nor DFA d. None of the above.

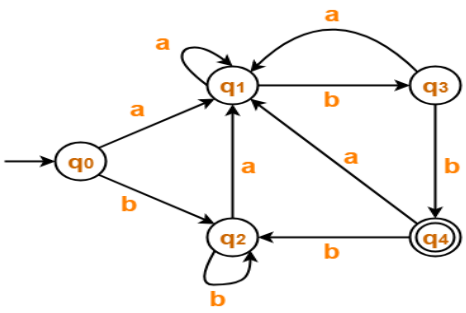
31. The language of the NFA shown in the Figure is:

a. aaa
b. $(aa)^*$
c. $aaa \cup (aa)^* ; n \neq 0$
d. None of the above



32. Number of states in the minimized DFA of the following DFA will be------

b. 2 b. 4 c. 3 d. 1



33. How many numbers of states require to accept string ends with 01 in DFA?

a. 3 b. 2 c.1 d. None of the above

34. The Deterministic Finite Automaton DFA is a 5-tuple (Q, Σ, δ, q_0, F), where Q defines the:

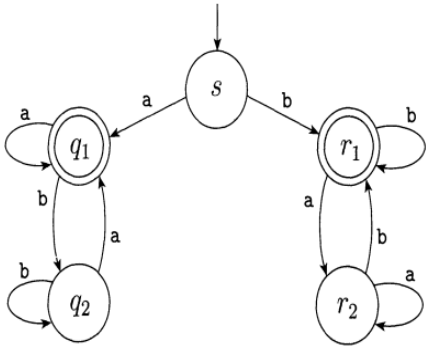
a. Number of Final States b. Transition Functions
c. Number of States d. Alphabet

35. The sum of minimum and maximum number of final states for a DFA with n states is equal to:

a. n+1 b. n c. n-1 d. n+2

36. The DFA shown in Figure describes the following language:

e. Every string starts and ends with the same letter
f. Every string starts and ends with a different letter
g. Every string contains only a's or b's but not both
h. None of the above



37. Which of the following options is correct?

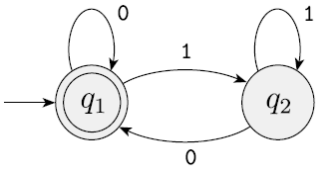
Statement i: Initial State of NFA is Initial State of DFA.

Statement ii: The final state of DFA will be every combination of final state of NFA.

a. Statement i is true and Statement ii is true b. Statement i is true and Statement ii is false
c. Statement i is false and Statement ii is true d. Statement i is false and Statement ii is also false

38. For the language L defined by the DFA in the following Figure, L accepts:

a. All strings on Σ = {0,1} that end with 1
b. All strings on Σ = {0,1} that end with 0
c. All strings on Σ = {0,1} that end with 0 and empty string
d. None of the above

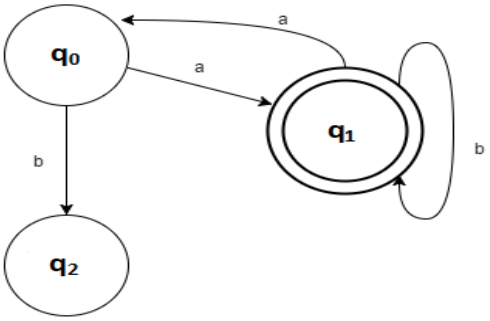


39. The finite automata accept the following language------

a. context free language b. regular language
c. context sensitive language d. all of the above.

40. Which of the following will not be accepted by the following machine?

A. ababaabaa B. abbbaa
C. abbbaabb D. abbaabbaa



With best wishes
Dr. Moustafa El-Ashry