



جامعة القاهرة
كلية الحاسبات والذكاء الاصطناعي

قسم: Software Engineering	تاريخ:
اسم المقرر: SC359	المدة: min
د. حسين محمد شرف	إجمالي الدرجات:

Software Security
Bonus Task

Khaled Shawki	20206018
Sohaila Gamal	20196026
Nariman Nasser	20196056
Ahmed Mohammed	20196007



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Question (1) Write the letter of the most correct answer

1) Process of checking that the developer is building the 'right' product

A) Verification	B) Testing
C) Validation	D) Maintenance

2) Process of ensuring that the product being built 'right'.

A) validation	B) Testing
C) Verification	D) Maintenance

3) Software Quality Factors (SQFs) Includes

A) Product operation requirements	B) Product revision requirements
C) Product transition requirements	D) All the mentioned

4) Determines how well the software does what the customer wants

A) Reliability	B) Reliability
C) Efficiency	D) Correctness

5) Determines how well the software does what it is supposed to do

A) Correctness	B) Reliability
C) Efficiency	D) Integrity

6) Determines how well the system runs on the customer's hardware

A) Correctness	B) Reliability
C) Efficiency	D) Integrity

7) Determines how well the data is secured

A) Correctness	B) Reliability
C) Efficiency	D) Integrity

8) Determines how easily bugs can be found and fixed

A) Maintainability	B) Testability
C) Flexibility	D) None of the above



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- 9) Determines how easily the system can be tested to show that the customer's requirements have been met

A) Testability	B) Maintainability
C) Flexibility	D) None of the above

- 10) Determines how easily the system can be changed while in service

A) Flexibility	B) Testability
C) A) Maintainability	D) None of the above

- 11) Determines how easy the system is to use

A) Reliability	B) Correctness
C) Usability	D) Efficiency

- 12) Test unit of functionality of an application

A) Unit Testing	B) Integration Testing
C) Regression Testing	D) System Testing

- 13) Test units are tested together

A) Unit Testing	B) Integration Testing
C) Regression Testing	D) System Testing

- 14) It checks that fixing one bug has not introduced others.

A) Unit Testing	B) Integration Testing
C) Regression Testing	D) System Testing

- 15) Test system against the customer's requirements.

A) Unit Testing	B) Integration Testing
C) Regression Testing	D) System Testing

- 16) Determines how easy it is to interface the system with another system

A) Interoperability	B) Maintainability
C) Reusability	D) Flexibility



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17) It refers to number of relationships the class has with other classes

E) Coupling-between-objects (CBO) metric	F) Number of Children (NOC) metric
G) All of the above	H) None of the above

18) Singletons Creational pattern is a

A) Microservice Pattern	B) Testing Pattern
C) Design Pattern	D) Architecture Pattern

19) JSON stands for

A) JavaScript Object Notation	B) JavaScript Object Normalization
C) Java Object Notation	D) None of the above

20) Used to sign session cookies for protection against cookie data tampering

A) Public Key	B) OTP Key
C) Private Key	D) NONE

21) It refers to the broad structure of a software system, it describes its major parts, and how they are put together and interact

A) Software Requirements	B) Software Testing
C) Software Maintainability	D) Software Architecture

22) Software architectural views are

A) Logical	B) Process
C) Deployment	D) All the mentioned

23) is an approach to build enterprise systems that deliver application functionality either as services to end-user applications or to build other services.

A) Service-oriented architecture	B) Web Service architecture
C) Microservice architecture	D) MVC architecture



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- 24) software module designed to support interoperable machine-to-machine interaction over a network

A) Service-oriented architecture	B) Web Service
C) Microservice architecture	D) MVC architecture

```
{  
  "Name": "Sanad",  
  "Author": "Khaled Shawki",  
  "mail": "khalid@gamil.com"  
}
```

- 25) The Previous code is an example of the format:

A) JSON	B) JSX
C) XML	D) None of the above

```
<employees>  
  <employee>  
    <firstName>Khaled</firstName>  
    <lastName>Shawki</lastName>  
  </employee>  
</employees>
```

- 26)

A) JSON	B) JSX
C) XML	D) None of the above

- 27) It refers to the exploitation of a valid session assigned to a user.

A) Session Hijacking	B) Cross-site scripting
C) Authentication	D) None of the above

- 28) Used for static analysis will take your code as input and analyze each line for any insecure functions or coding practices

A) SAST	B) DAST
C) NAST	D) MUST



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Use the following code to answer questions 29 to 39

```
1  from flask import Flask, jsonify, request
2  app = Flask(__name__)
3
4  # Sample data
5  books = [
6      {'id': 1, 'title': 'Book 1'},
7      {'id': 2, 'title': 'Book 2'}
8  ]
9
10
11 @app.route('/books', methods=['GET'])
12 def get_books():
13     return jsonify(books)
14
15
16 @app.route('/books/<int:book_id>', methods=['GET'])
17 def get_book(book_id):
18     book = next((book for book in books if book['id'] == book_id),
19 None)
20     if book:
21         return jsonify(book)
22     else:
23         return jsonify({'error': 'Book not found'}), 404
24
25
26 @app.route('/books', methods=['POST'])
27 def create_book():
28     new_book = {'id': len(books) + 1, 'title': request.json['title']}
29     books.append(new_book)
30     return jsonify(new_book), 201
31
32 @app.route('/books/<int:book_id>', methods=['DELETE'])
33 def delete_book(book_id):
34     book = next((book for book in books if book['id'] == book_id),
35 None)
36     if book:
37         books.remove(book)
38         return jsonify({'message': 'Book deleted'})
39     else:
40         return jsonify({'error': 'Book not found'}), 404
41
42 if __name__ == '__main__':
43     app.run()
```



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29) What is the purpose of the Flask library in this code?

A) To handle HTTP requests and responses	B) To perform database operations
C) To store and retrieve data	D) None of the above

30) What HTTP status code will be returned if a requested book is not found?

A) 200 OK	B) 201 Created
C) 400 Bad Request	D) 404 Not Found

31) What does the “/books” route with the GET method do?

A) Retrieves all books from the database	B) Deletes a specific book from the database
C) Creates a new book in the database	D) Updates a specific book in the database

32) What does the “/books/<int:book_id>” route with the GET method do?

A) Retrieves all books from the database	B) Deletes a specific book from the database
C) Creates a new book in the database	D) Get a specific book in the database

33) What does the “/books” route with the POST method do?

E) Retrieves all books from the database	F) Deletes a specific book from the database
G) Creates a new book in the database	H) Updates a specific book in the database

34) What is the purpose of the “Jsonify” function in this code?

A) Converts JSON data to Python objects	B) Converts JSON data to HTML format
C) Converts Python objects to JSON data	D) Converts HTML format to JSON data



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35) How are new books added to the books list?

A) By using the GET method on the '/books' route	B) By using the DELETE method on the '/books' route
C) By using the POST method on the '/books' route	D) By using the PUT method on the '/books/<int:book_id>' route

36) What is the purpose of the if `__name__ == '__main__':` condition at the end of the code?

A) It ensures the code is only executed if the script is run directly	B) It defines the main function for the Flask application
C) It checks if the server is running in the main thread	D) It imports the necessary modules for the Flask application

37) What is the purpose of the 404 status code in this code?

A) Indicates a successful request	B) Indicates a client error (resource not found)
C) Indicates a resource was created successfully	D) Indicates a server error

38) How are the book objects stored in memory in this code?

A) In a local file on the server	B) In a list called books
C) In a remote database	D) In a text file

39) What is the endpoint to retrieve all books?

A) 'http://127.0.0.1/books'	B) 'http://127.0.0.1/str:book_title'
C) 'http://127.0.0.1/books/int:book_id'	D) 'http://127.0.0.1/books/all'

40) What is the response code when a book is successfully deleted?

A) 204	B) 201
C) 200	D) 400



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41) Which library is imported to handle HTTP requests and responses in the code?

A) Flask	B) Request
C) Jsonify	D) Python

42) Which of the following best describes a threat in software security?

A) A weakness or flaw in software code	B) The likelihood of a software system being attacked
C) An event or circumstance that has the potential to cause harm to software	D) The impact or consequence of a security breach

43) What is a vulnerability in software security?

A) The likelihood of a security incident occurring	B) The potential harm caused by a security incident
C) A weakness or flaw in software that can be exploited	D) The level of risk associated with a software system

44) Risk in software security is defined as:

A) The combination of threats and vulnerabilities	B) The potential impact or consequence of a security incident
C) The likelihood of a security incident occurring	D) The measures in place to protect against threats and vulnerabilities

45) Which of the following best defines confidentiality?

A) Protecting information from unauthorized disclosure	B) Making information available when needed
C) Ensuring that information is accurate and reliable	D) Ensuring that information is not altered or tampered with



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46) What does the integrity principle of the CIA triad in security refer to?

A) Keeping information confidential and preventing unauthorized access	B) Making sure that information is available and accessible
C) Ensuring that information is accurate, complete, and trustworthy	D) Safeguarding information against loss or destruction

47) Availability, as a principle of the CIA triad, means:

A) Ensuring that information is accessible to authorized individuals	B) Maintaining the privacy and secrecy of sensitive information
C) Protecting information from unauthorized modification or deletion	D) Verifying the accuracy and consistency of information

48) What is the primary purpose of authentication in cybersecurity?

A) Ensuring data confidentiality	B) Controlling access to resources
C) Verifying the identity of users or entities	D) Monitoring and logging user activities

49) What does authorization refer to in the context of AAA?

A) Verifying the integrity of data	B) Granting or denying access to specific resources
C) Ensuring data availability	D) Recording and tracking user actions

50) What is the role of accounting in AAA?

A) Authenticating users and entities	B) Recording and tracking user activities and resource usage
C) Authorizing access to resources	D) Encrypting data to protect its confidentiality



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51) What is the purpose of Segregation of Duties in cybersecurity?

A) Preventing conflicts of interest and reducing the risk of fraud or unauthorized activities	B) Granting users access to resources based on their job titles
C) Ensuring that all users have the same level of access to resources	D) Sharing administrative privileges among all users

52) What does the principle of Need to Know in cybersecurity entail?

A) Providing users with access to all available information	B) Giving all users the same level of access to data and resources
C) Restricting access to sensitive information to only those who require it for their job responsibilities	D) Sharing sensitive information with anyone who asks for it

53) process of transforming the plaintext into an unreadable form

A) Encryption	B) Decryption
C) Transposition	D) None of the above

54) What is the principle of Least Privilege in cybersecurity?

A) Providing users with the minimum level of access necessary to perform their job functions	B) Granting administrative privileges to all users for convenience
C) Sharing all available information with every user	D) Assigning the highest level of access to all users by default

55) XSS (Cross-Site Scripting) is a vulnerability that primarily affects:

A) Web browsers	B) Database systems
C) Network Infrastructure	D) Network infrastructure



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56) Which of the following best describes SQL Injection?

A) A technique used to inject malicious scripts into web pages viewed by users	B) A type of malware that spreads through SQL databases
C) A method of gaining unauthorized access to a database by manipulating SQL queries	D) A method of intercepting network traffic to obtain sensitive information

57) What is the main goal of an attacker in an XSS or SQL Injection attack?

A) To gain administrative access to the target system	B) To disrupt the availability of the target system
C) To extract sensitive information from the target system	D) To install malware on the target system

58) It is a substitution technique that shifts each letter of the plaintext by number of places which is the key to produce the ciphertext

A) Caesar cipher	B) Vernam cipher
C) Encryption	D) None of the above

59) It is a substitution technique that implements exclusive or operation (^) on each bit of plaintext with the corresponding bit in key, thus the key length must equal to the plaintext length.

A) Caesar cipher	B) Vernam cipher
C) Transposition ciphers	D) Rail fence cipher

60) It is written as a sequence of diagonals with any depth and then read off as a sequence of rows.

A) Caesar cipher	B) Vernam cipher
C) Transposition ciphers	D) Rail fence cipher



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- 61) Write letters of message out in rows over a specified number of columns. Then reorder the columns according to some key before reading off the rows.

A) Caesar cipher	B) Vernam cipher
C) Transposition ciphers	D) Rail fence cipher

- 62) Which of the following is not an example of a block cipher?

A) DES	B) Caesar cipher
C) IDEA	D) Twofish

- 63) This helps in identifying the origin of information and authentic user. This referred to here as

A) Authenticity	B) Availability
C) Integrity	D) Confidentiality

- 64) _____ of information means, only authorized users are capable of accessing the information.

A) Availability	B) Integrity
C) Confidentiality	D) Non-repudiation

- 65) CIA triad is also known as

A) NIC (Non-repudiation, Integrity, Confidentiality)	B) AIC (Authenticity, Integrity, Confidentiality)
C) AIN (Availability, Integrity, Non-repudiation)	D) AIC (Availability, Integrity, Confidentiality)

- 66) Which number of independent paths of the following adds 1 to cyclomatic complexity, start counting from 1:

A) (while, do while, for) loops	B) Variable initialization
C) Assign operation	D) None of the above

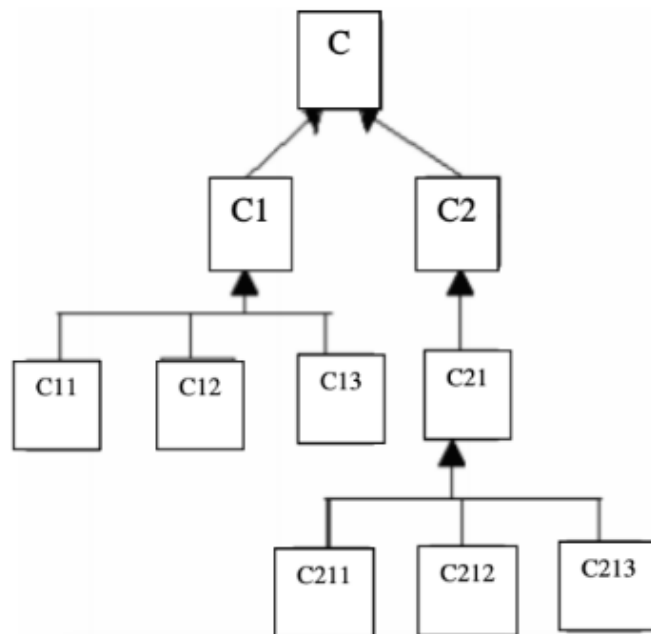


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67) What is the purpose of the route() decorator in Flask?

A) To create instance of the Flask application	B) To import the Flask class
C) To trigger a specific URL for a function	D) To generate URLs for a particular function



68) What is the DIT for class C11

A) 1	B) 2
C) 3	D) 4

69) What is the DIT for class C213, C2

A) 3,0	B) 2,0
C) 1,0	D) 3,1



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If (Condition 1)
Statement 1

Else
Statement 2

If (Condition 2)
Statement 3

Else
Statement 4

70) Cyclomatic Complexity for this program will be

A) 1	B) 3
C) 2	D) 4

Use the following to answer questions 71 to 73

A web server has been running for a month. From the log files for that month we see that, of 2500 accesses, 120 attacks were made. Of these, 60 were denial-of-service attacks, of which 10 were successful, 35 were password guessing (of which none were successful) and 25 were accidental attacks (caused by errors on the part of the user), of which 25 were successful

71) Denial of service threat, security

A) 10/2500, 10/60	B) 10/2500, 10/50
C) 60/2500, 50/60	D) 60/2500, 50/50

72) Password guessing threat, security

A) 35/2500, 0/35	B) 0/2500, 0/35
C) 35/2500, 35/35	D) 0/2500, 35/35



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73) Accidental threat, security

A) 25/2000, 0/25	B) 25/2500, 0/25
C) 0/2500, 0/25	D) 25/2500, 25/25

Part 2: Use the following problem to answer questions 74 to 84

You intercepted the following encrypted message: "Ymj vznhp gwtbs ktc ozruji tajw ymj qfed itl". It appears to be encrypted using a Caesar Cipher with a certain key. Decrypt the message and find the original plaintext.

74) What encryption technique is likely used to encrypt the intercepted message?

A) Substitution Cipher	B) Vernam Cipher
C) Caesar Cipher	D) S-box

75) In a Caesar Cipher, what is the key?

A) A random sequence of letters	B) A matrix of substitution letters
C) A numerical value indicating the shift	D) A combination of numbers and symbols

76) If the key for the Caesar Cipher used to encrypt the intercepted message is 5, what is the decrypted message?

A) "The quick brown fox jumps over the lazy dog"	B) "Sgd pthbj aqnvm cnu htslq zmcv sgd kxwv bmf"
C) "Xli szivw gwtbs lazmr qefp ymj rkdu mxp"	D) "Rfc ocrfg xliji wjmf ufybnsI nyhts qfsg"

77) The Vernam Cipher is also known as:

A) Shift Cipher	B) One-Time Pad
C) Substitution Cipher	D) Transposition Cipher



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78) In a Substitution Cipher, how is the substitution determined?

A) By shifting the letters of the alphabet	B) By applying a matrix transformation
C) By using a pre-defined table of letter mappings	D) By using bitwise XOR operations

79) The S-boxes are commonly used in which encryption algorithm?

A) They perform substitution operations on plaintext or ciphertext	B) They perform transposition operations on plaintext or ciphertext
C) They generate random keys for each encryption session	D) They combine multiple encryption techniques

80) Which cipher uses a fixed substitution table known as the Caesar box?

A) Caesar Cipher	B) Rail Fence Cipher
C) Vernam Cipher	D) Playfair Cipher

81) Which encryption technique guarantees perfect secrecy if used correctly?

A) Substitution Cipher	B) Vernam Cipher
C) Caesar Cipher	D) S-box

82) If a Vernam Cipher is used with a truly random key of the same length as the plaintext, what can be said about the security of the encrypted message?

A) It is unbreakable and provides perfect secrecy.	B) The security depends on the strength of the key.
C) It can be easily decrypted using frequency analysis.	D) The encryption is vulnerable to brute-force attacks.

83) The S-boxes are commonly used in which encryption algorithm?

A) AES	B) RSA
C) DES	D) Diffie-Hellman



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84) Which of the following encryption techniques is based on the concept of bitwise XOR operations?

A) Substitution Cipher	B) Vernam Cipher
C) Caesar Cipher	D) S-box

True & False

1.	Risk and vulnerabilities are the same things.	F
2.	SQL Injection is a one of Common Software Vulnerabilities.	T
3.	Cross-site Scripting is not a one of Common Software Vulnerabilities.	F
4.	Passive attack related to message modification.	F
5.	Active attack related to message reading only.	F
6.	Palin text is not a component of block cipher model.	T
7.	All users must have the same privilege.	F
8.	No need for input validation	F
9.	Validation is occurring on client-side only	F
10.	You must check for input validity at the server	T
11.	block cipher using key with length 128 bits is more secure than 64 bits.	T
12.	Security steps begin after software design.	F
13.	For Critical data you must not use http request rather than https	F
14.	DES is a asymmetric block cipher	F
15.	DES used in digital signature	F
16.	Phishing attacks can exploit any user even if they refuse to give information or have awareness.	F