PROMO

INTERNATIONAL SOFTWARE ENGINEERING OLYMPIAD

Version 3

Question 1 (2 points)

Which of the following processes relate to converting data structures into bytes and back? You can select multiple answers.

- Serialization
- Deserialization
- Encryption
- Copying

Question 2 (2 points)

Select the valid git commands.

You can select multiple answers.

- git pull
- git add .
- git reset hard
- git add file.txt
- git update file.txt

Question 3 (1 points)

Select the correct statement.

- Method overriding is a mechanism that allows changing the behavior of a method in a child class
- Method overloading is a mechanism that allows the use of methods with the same name but different parameters
- All statements are correct

Question 4 (2 points)

Select the correct statements.

You can select multiple answers.

- HTTP status code 403 is returned when an incorrect username or password is provided
- HTTP status code 404 is returned when a user lacks sufficient permissions
- HTTP status code 500 is returned in the case of a server-side error
- HTTP status code 400 is returned when the client sends invalid data to the server

Question 5 (2 points)

Select the correct statements.

You can select multiple answers.

- A tree is a connected graph with no cycles
- In a graph, loops are edges that connect a vertex to itself
- In an undirected graph, there is always a path between any two vertices
- In a graph, there are always more vertices than edges

Question 6 (2 points)

Which of the following are valid CSS properties?

You can select multiple answers.

- border-radius
- display
- opacity
- link-color
- width-proportion

Question 7 (2 points)

Select the correct statements.

You can select multiple answers.

- A queue can be implemented using two stacks
- A deque can be used as a queue, but not as a stack
- A queue can be used as a stack
- A dynamic array can be used as a stack

Question 8 (2 points)

Select the correct statements.

You can select multiple answers.

- If the hash function results for two values are equal, the original values being hashed are also equal
- If the result of a hash function is known, the original hashed value can easily be retrieved
- A hash function always returns a string
- None of the above are correct

Question 9 (2 points)

Select the correct statements.

You can select multiple answers.

- Monetary amounts used in calculations are stored as Int, Int64, or Long values in applications
- Monetary amounts used in calculations are stored Float, Float64, or Double values in applications
- Monetary amounts used in calculations are stored in applications using types that rely on arbitrary-precision arithmetic
- Monetary amounts used in calculations are stored as String values in applications

Question 10 (2 points)

Select the correct statements.

You can select multiple answers.

- Python is an interpreted programming language
- C++ is an interpreted programming language

- Java is a declarative programming language
- C++ supports object-oriented programming

Question 11 (2 points)

For which scenarios, according to REST, is it correct to use the GET method?
You can select multiple answers.

- Creating a user
- Registering for a flight
- Launching background tasks
- Retrieving a list of posts in a social network
- Displaying a list of transactions made by an online banking user

Question 12 (2 points)

Select the correct statements.

You can select multiple answers.

- Insertion sort runs in O(N log N)
- Selection sort always runs in O(N2)
- Merge sort always runs in O(N log N)
- Quicksort always runs in O(N log N)

Question 13 (2 points)

Select the correct statements.

You can select multiple answers.

When a browser and a backend server interact over HTTP, the following happens:

- The browser always sends data to the server in JSON format
- The browser always sends data to the server in XML format
- The browser can upload a file to the server
- The browser can send requests to different servers

Question 14 (2 points)

Select the UI container objects used for layout and positioning of other UI elements in mobile development. You can select multiple answers.

- ArrayViews
- Buttons Layout
- Collection
- Stack

Question 15 (2 points)

Select the correct statements.

You can select multiple answers.

- A backend application can store data in RAM
- A backend application can store data on a hard drive
- A backend application always stores data in a database
- After restarting a backend application, the data stored in RAM will be preserved

Question 16 (2 points)

According to REST, in which part of an HTTP POST request can data for creating a user be passed? You can select multiple answers.

- Request header
- Query parameters
- Request body
- In the method name

Question 17 (1 points)

What is a media query?

- A web browser plugin that allows playing audio and video files
- A method used to define and apply styles based on screen resolution and other device characteristics
- An API that provides access to multimedia resources on a web page
- A JavaScript library for creating and managing multimedia content on a web page

Question 18 (2 points)

What is the purpose of signing a mobile application?

You can select multiple answers.

- To confirm authenticity
- To encrypt the source code
- To confirm integrity
- To optimize application startup

Question 19 (2 points)

Select the correct statements related to vertical scaling. You can select multiple answers.

- Increasing the hard drive storage capacity on a server
- Increasing the amount of RAM on a server
- Increasing the number of application instances
- Increasing the number of data centers

Question 20 (2 points)

Which of the following pseudo-classes exist in CSS?

You can select multiple answers.

- placeholder
- before
- invalid
- nth-child

Question 21 (2 points)

Select the correct statements.

You can select multiple answers.

- Retrieving the minimum element from a balanced binary search tree takes O(N log N)
- Inserting onto the top of a stack takes O(N)
- Inserting into a queue takes O(1)
- Deleting an element from the beginning of an array takes O(1)

Question 22 (2 points)

Which data structures exist in JavaScript according to the current standard?
You can select multiple answers.

- String
- WeakMap
- List
- Uint8Array
- Vector

Question 23 (2 points)

Select the correct statements.

You can select multiple answers.

- A mobile application can save data on the device
- Data from a backend application cannot be stored in the browser
- A frontend application can operate without a backend application
- A single backend application can be implemented for both a mobile application and a web browser interface

Question 24 (2 points)

Which APIs does the browser provide?

You can select multiple answers.

- Clipboard API
- Push API
- User Activity API
- Service Workers API
- Email API

Question 25 (5 points)

The get_next_orders function takes n, which is the number of next orders in the system, and returns those orders. The client always wants to see only the next single order, but get_next_orders retrieves data from remote storage and calling it every time for a single event would be costly. Therefore, we want to fetch 20 values at a time, buffer them in an intermediate array, and return the next value from the buffer to the user.

Select the correct code implementation:

- def get _ next _ order():
  if next _ idx == len(buffer):
  buffer = get _ next _ orders(20)
  next _ idx = 0
  return buffer[next _ idx]
- def get _ next _ order():
  if next _ idx == len(buffer):
  buffer = get _ next _ orders(20)
  next _ idx = 0
  res = buffer[next _ idx]
  next _ idx += 1
  return res
- def get _ next _ order():
  if next _ idx == len(buffer):
  buffer = get _ next _ orders(20)
  next _ idx = 1
  res = buffer[next _ idx]
  next _ idx += 1
  return res
- def get _ next _ order():
  if next _ idx == len(buffer):
  buffer = get _ next _ orders(20)
  res = buffer[next _ idx]
  next _ idx += 1
  return res

Question 26 (5 points)

There is an application where users can publish posts. When a post is viewed for the first time, a push notification is sent indicating that the post has been viewed. For all subsequent views, no notification is sent.

Select the correct implementation of the post view function, given that this function can be called by multiple users, but not at the same time.

- def view _ post(post _ id):
  post = database.get _ post(post _ id)
  post.views += 1
  if post.views == 1:
  send _ push _ notification(post.author _ id, 'Post has been viewed')
  database.save _ post(post)

- def view _ post(post _ id):
  post = database.get _ post(post _ id)
  post.views += 1
  if post.views == 1:
  send _ push _ notification(post.author _ id, ‘Post has been viewed’)
- def view _ post(post _ id):
  post = database.get _ post(post _ id)
  post.views += 1
  database.save _ post(post)
  if post.views == 0:
  send _ push _ notification(post.author _ id, ‘Post has been viewed’)
- def view _ post(post _ id):
  post = database.get _ post(post _ id)
  post.views += 1
  database.save _ post(post)
  if post.views == 1:
  send _ push _ notification(post.author _ id, ‘Post has been viewed’)

Question 27 (6 points)

You're implementing a service for a bank client. One of the functions in the service is to show the client the total amount of all their completed transactions. Fortunately, the system already has a service that can calculate statistics for a client, but the calculation takes a long time, so you'll cache the data within your service. However, when a new transaction is made, it must be passed to the statistics service so that next time it can correctly calculate the total transaction amount based on the updated data. Select the correct implementations of the functions for retrieving statistics with caching and performing a transaction. You can select multiple answers.

- def get _ statistics(client _ id):
  if not cache.exists(client _ id):
  amount = stat _ service.get _ statistics(client _ id)
  cache.put(client _ id, amount)
  return cache.get(client _ id)
  def create _ transaction(transaction):
  stat _ service.save _ transaction(transaction)
- def get _ statistics(client _ id):
  if cache.exists(client _ id):
  amount = stat _ service.get _ statistics(client _ id)
  cache.put(client _ id, amount)
  return cache.get(client _ id)
  def create _ transaction(transaction):
  stat _ service.save _ transaction(transaction)
  cache.clear(transaction.client _ id)

- def get _ statistics(client _ id):
  if not cache.exists(client _ id):
  amount = stat _ service.get _ statistics(client _ id)
  cache.put(client _ id, amount)
  return cache.get(client _ id)
  def create _ transaction(transaction):
  stat _ service.save _ transaction(transaction)
  cache.clear(transaction.client _ id)

- def get _ statistics(client _ id):
  if cache.exists(client _ id):
  amount = stat _ service.get _ statistics(client _ id)
  return cache.get(client _ id)
  def create _ transaction(transaction):
  stat _ service.save _ transaction(transaction)
  cache.clear(transaction.client _ id)

Question 28 (6 points)

You're creating a chat messenger for bank customers to communicate with support. The task has come up to block a user if a word from the list of forbidden words appears more than 3 times in their messages. Additionally, a message should not be sent if it contains a word from the list of forbidden words. Select the correct implementations of the message sending function.

You can select multiple answers.

- def send _ message(client _ id, other _ client _ id, message):
  if message not in BAD _ WORDS:
  send _ message(other _ client _ id, message)
  clients _ attempts[client _ id] += 1
  if clients _ attempts[client _ id] >= 3:
  block _ client(client _ id)

- def send _ message(client _ id, other _ client _ id, message):
  if message not in BAD _ WORDS:
  send _ message(other _ client _ id, message)
  clients _ attempts[client _ id] += 1
  if clients _ attempts[client _ id] > 3:
  block _ client(client _ id)

- def send _ message(client _ id, other _ client _ id, message):
  if message not in BAD _ WORDS:
  send _ message(other _ client _ id, message)
  return
  clients _ attempts[client _ id] += 1
  if clients _ attempts[client _ id] > 3:
  block _ client(client _ id)

- def send _ message(client _ id, other _ client _ id, message):
  if message not in BAD _ WORDS:
  send _ message(other _ client _ id, message)
  else:
  clients _ attempts[client _ id] += 1
  if clients _ attempts[client _ id] > 3:
  block _ client(client _ id)

Question 29 (16 points)

You're creating an application for purchasing products. In this application, users can navigate to each product's page. Users can browse and view different products. For the user's convenience, a separate list of products must be displayed based on their browsing history, so that the user can return to products they previously viewed.

Input data

The first line contains an integer N (1 < N < 105), which is the number of products available in the store. The following N lines contain ai–bi pairs, where ai (1 < ai < 107) is an integer product ID and bi is a string with the product name, which does not exceed 105 characters. Product IDs and names are unique. Next comes an integer T (1 < T < 107), which is the number of product views. The following line contains T integer product IDs representing the products the user viewed.

Output

Print the product names across N lines according to the browsing history, with the most recently viewed products at the beginning. Products that were not viewed should not be printed.