# PR - LEC 2 QUESTION BANK

Helping Others Have Special taste

# Questions

**1. What is the primary goal of pattern recognition?**

A) Identifying and classifying patterns
B) Modifying existing patterns
C) Randomly assigning labels to patterns
D) Ignoring patterns

**2. What is used to determine if two circular arcs belong to the same circle?**

A) Length of the arcs
B) Radius and center location
C) Color of the arcs
D) Arc angle only

**3. What is a major challenge in pattern recognition?**

A) Over-simplification
B) Feature extraction
C) Lack of computational power
D) Ignoring data

**4. In circular arc recognition, how is the center identified?**

A) By estimating its position manually
B) By intersecting perpendiculars at different points
C) By measuring the arc's height
D) By counting the number of arcs

**5. What can cause a circular arc to appear discontinuous?**

A) Poor lighting
B) Weak magnetic fields
C) Incorrect color mapping
D) Occlusion by other objects

**6. Which type of learning requires labeled data?**

A) Supervised learning
B) Unsupervised learning
C) Reinforcement learning
D) Self-organizing maps

**7. What is a feature vector in pattern recognition?**

A) A set of random values

B) A sequence of symbols

C) A mathematical representation of extracted features

D) A list of unrelated numbers

**8. Why are similarity measures important in machine learning?**

A) To identify relationships between feature vectors

B) To store data

C) To delete unnecessary features

D) To increase computational complexity

**9. Which of the following is a problem in feature extraction?**

A) Selecting features that do not capture unique properties

B) Having too many feature vectors

C) Using too much memory

D) Extracting only numerical values

**10. Which feature is sufficient to classify circular arcs?**

A) Color and shape

B) Radius and center

C) Edge sharpness

D) Orientation

**11. How does unsupervised learning differ from supervised learning?**

A) It does not require labeled data

B) It performs worse in real applications

C) It is the same as reinforcement learning

D) It requires more training time

**12. What is one advantage of supervised learning?**

A) It can work without labeled data

B) It provides explicit class labels

C) It requires no feature extraction

D) It does not need training

**13. Why is the reverse mapping from a feature vector to a pattern challenging?**

A) Feature vectors are always unique

B) Multiple patterns can have the same feature vector

C) It is computationally simple

D) Patterns are always distinct

**14. Which problem occurs due to errors in pattern segmentation?**

A) Incomplete or inaccurate feature extraction
B) Overfitting in machine learning models
C) Over-segmentation of patterns
D) Feature compression issues

**15. What is the purpose of a similarity measure in pattern recognition?**

A) To assign random labels
B) To reduce computational speed
C) To increase dataset complexity
D) To compare feature vectors and determine similarity

**16. What is the primary goal of feature extraction?**

A) Reducing the dataset size
B) Increasing computational complexity
C) Removing outliers
D) Identifying relevant characteristics for classification

**17. Which approach helps in handling segmentation errors in pattern recognition?**

A) Randomized feature selection
B) Robust feature extraction
C) Avoiding feature engineering
D) Ignoring missing data

**18. What are chain codes used for?**

A) Image classification
B) Speech recognition
C) Boundary representation of shapes
D) Feature normalization

**19. What is a limitation of standard chain codes?**

A) They require labeled data
B) They depend on the starting point
C) They can only represent simple shapes
D) They ignore feature vectors

**20. What is the main advantage of differential chain codes?**

A) They are completely noise-free
B) They provide rotation invariance
C) They work only for circular shapes
D) They are independent of connectivity schemes

**21. How does unsupervised learning partition data?**

A) Using predefined labels

B) By random assignment

C) Using a manually labeled dataset

D) Based on feature vector similarities

**22. What problem does chain code compression address?**

A) Storage efficiency

B) Shape recognition errors

C) Feature selection

D) Learning rates

**23. What is an application of chain codes?**

A) Robot navigation

B) Data encryption

C) Feature fusion

D) Feature extraction in textual data

**24. What is a key difference between pattern recognition and machine learning?**

A) Pattern recognition does not use features

B) Machine learning focuses on optimization

C) Pattern recognition is more computationally expensive

D) Machine learning does not rely on features

**25. What is a common issue with measuring similarity between patterns?**

A) Uniqueness of feature vectors

B) Noise and errors in measurement

C) Excessive computation time

D) Overfitting in all cases

**26. Suppose you have two circular arcs with centers (3,5) and (3.1, 5.2). If their radii are 10 and 9.95, can they be part of the same circle?**

A) Yes

B) No

C) Only if they have the same angle

D) Not enough information

**27. A shape boundary is represented using an 8-connectivity chain code. If it is rotated by 90 degrees clockwise, how will the chain code change?**

A) Each value increases by 2 modulo 8

B) It remains the same

C) Each value decreases by 2 modulo 8

D) The chain code becomes meaningless

**28. In an unsupervised learning algorithm, how can you determine the optimal number of clusters?**

A) By manually labeling clusters
B) By setting a fixed number
C) Using the Elbow Method
D) Using only hierarchical clustering

**29. What is the best way to improve a pattern recognition system handling occluded shapes?**

A) Ignore occluded data
B) Increase dataset size only
C) Use multimodal approaches
D) Reduce feature vectors

**30. What is the best method to handle rotational variance in shape recognition?**

A) Ignoring rotated shapes
B) Increasing dataset size
C) Applying more convolution layers
D) Differential chain codes

**31. What is the role of feature vectors in pattern recognition?**

A) They store raw image data
B) They encode essential pattern characteristics
C) They eliminate noise in data preprocessing
D) They classify data directly

**32. Which method improves the robustness of a pattern recognition system?**

A) Using redundant features
B) Employing adaptive learning algorithms
C) Ignoring errors in segmentation
D) Reducing the number of training samples

**33. In supervised learning, how does a model learn?**

A) By grouping similar patterns without prior labels
B) By discarding irrelevant features
C) By mapping input patterns to labeled outputs
D) By clustering similar features

**34. Which of the following is a challenge in feature selection?**

A) Selecting features that generalize well
B) Using a small dataset
C) Eliminating all noise from the data
D) Avoiding the use of numerical data

**35. How do multimodal approaches improve pattern recognition?**
A) They introduce redundancy
B) They remove the need for training data
C) They simplify feature extraction
D) They combine multiple sources of information

**36. What is one major issue with segmentation errors in pattern recognition?**
A) It can introduce quantization noise
B) It always improves accuracy
C) It eliminates variability in features
D) It makes feature extraction easier

**37. How can similarity measures be computed?**
A) Using Euclidean or Mahalanobis distance
B) By summing the feature values
C) By randomly assigning distances
D) Using only binary classification

**38. Why is feature extraction important in pattern recognition?**
A) It reduces computation time
B) It avoids the use of machine learning
C) It directly classifies data
D) It eliminates noise completely

**39. What is the main advantage of unsupervised learning in pattern recognition?**
A) It requires labeled training data
B) It discovers hidden patterns without labels
C) It is easier to implement
D) It does not require feature extraction

**40. Which factor can make pattern recognition more challenging?**
A) Over-simplified feature vectors
B) A large amount of data
C) A perfectly labeled dataset
D) Noisy or incomplete data

**41. A feature vector for a shape consists of (radius, number of edges). Which classifier is** best for this dataset?
A) k-Nearest Neighbors
B) Naive Bayes
C) Random search
D) Any model without training

**42. If an image is rotated by 180 degrees, how does its differential chain code change?**

A) Each value increases by 1

B) It remains unchanged

C) It reverses direction

D) It becomes invalid

**43. A robot navigates an environment using chain codes for obstacle detection. Which type of chain code is best for rotation-invariant recognition?**

A) Fixed-length chain code

B) Absolute chain code

C) Differential chain code

D) Randomized chain code

**44. Which factor affects the accuracy of feature extraction in pattern recognition?**

A) Measurement errors

B) Number of patterns

C) Existence of perfect features

D) Number of training epochs

**45. If a circular arc is occluded, how can its original circle be identified?**

A) By estimating its center and radius

B) By extending the arc manually

C) By guessing its original shape

D) By ignoring occlusion

**46. What is the main advantage of using feature vectors in machine learning?**

A) They eliminate the need for training

B) They remove all errors

C) They work only for small datasets

D) They reduce dimensionality and improve classification

**47. A shape has a feature vector (10, 5, 2). Another has (10.1, 5.1, 2.1). Which similarity measure is best?**

A) Absolute difference

B) Random similarity

C) Cosine similarity

D) Euclidean distance

**48. What is an effective method to handle missing data in pattern recognition?**

A) Using imputation techniques

B) Ignoring missing values

C) Removing entire feature vectors

D) Duplicating missing values

**49. Which property makes chain codes efficient for shape representation?**

A) They are error-free

B) They provide compact encodin

C) They require no training

D) They ignore rotation

**50. How can rotation invariance be introduced in pattern recognition?**

A) By increasing training data size

B) By using differential features

C) By ignoring rotated patterns

D) By reducing feature complexity

**51. A machine learning model has poor generalization in pattern recognition. What is a likely cause?**

A) Low feature extraction quality

B) High training accuracy

C) Overfitting

D) Ignoring noise

**52. If an 8-connectivity chain code is modified for curved segments, what is its advantage?**

A) Better shape approximation

B) Increased complexity

C) No need for feature vectors

D) It cannot represent circles

**53. What is a disadvantage of absolute chain codes?**

A) They do not work for simple shapes

B) They require high memory

C) They cannot store feature vectors

D) They are not rotation-invariant

**54. How does feature selection affect classification accuracy?**

A) It increases model complexity

B) It reduces data noise

C) It removes irrelevant features

D) It does not affect classification

**55. A dataset with patterns (x, y) is clustered. What method helps determine the best number of clusters?**

A) Elbow Method

B) Random clustering

C) Fixed-size clusters

D) Label-based clustering

**56. What issue can arise if a pattern recognition model is too complex?**

A) It may generalize well

B) It may overfit to training data

C) It will always perform better

D) It removes segmentation errors

**57. In which application is pattern recognition most commonly used?**

A) Network security only

B) Random number generation

C) Simple text storage

D) Face recognition

**58. How does increasing the number of features affect pattern classification?**

A) It always improves accuracy

B) It may introduce noise and redundancy

C) It has no impact

D) It removes occlusion errors مطابق

**59. If two feature vectors have identical values, what can be concluded?**

A) One feature vector is incorrect

B) They must be different

C) The patterns are likely similar

D) The similarity measure is incorrect

**60. A recognition system has errors due to measurement variations. What technique can reduce errors?**

A) Removing feature vectors with errors

B) Ignoring variations

C) Reducing dataset size

D) Using robust feature extraction

# Answers

| Question | Answer |
|---|---|
| 1 | A |
| 2 | B |
| 3 | B |
| 4 | B |
| 5 | D |
| 6 | A |
| 7 | C |
| 8 | A |
| 9 | A |
| 10 | B |
| 11 | A |
| 12 | B |
| 13 | B |
| 14 | A |
| 15 | D |
| 16 | D |
| 17 | B |
| 18 | C |
| 19 | B |
| 20 | B |
| 21 | D |
| 22 | A |
| 23 | A |
| 24 | B |
| 25 | B |
| 26 | A |
| 27 | A |
| 28 | C |

| | |
|---|---|
| 29 | C |
| 30 | D |
| 31 | B |
| 32 | B |
| 33 | C |
| 34 | A |
| 35 | D |
| 36 | A |
| 37 | A |
| 38 | A |
| 39 | B |
| 40 | D |
| 41 | A |
| 42 | C |
| 43 | C |
| 44 | A |
| 45 | A |
| 46 | D |
| 47 | D |
| 48 | A |
| 49 | B |
| 50 | B |
| 51 | C |
| 52 | A |
| 53 | D |
| 54 | C |
| 55 | A |
| 56 | B |
| 57 | D |
| 58 | B |
| 59 | C |
| 60 | D |

## We Hope we could Help You

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# PP - FINAL MCQ QUESTION BANK

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# Questions

**1. What is the key drawback of overusing locks in parallel programs?**
A) Increased memory usage
B) High CPU load
C) Reduced concurrency
D) More IO waiting

**2. What distinguishes parallel from serial operations at the most fundamental level?**
A) The use of different programming languages
B) The way registers are utilized
C) The type of data being processed
D) The speed of individual CPUs

**3. What are multi-core processors?**
A) Chips with only one CPU
B) Integrated circuits with two or more CPUs
C) Processors designed only for graphical computations
D) Processors with sequential processing capabilities

**4. How does parallel processing enhance real-time data handling?**
A) By using fine-grained parallelism for frequent communication among tasks
B) By slowing down task communication for accuracy
C) By relying entirely on a single CPU
D) By skipping intermediate computation steps

**5. What makes clusters unique in parallel computing?**
A) They are single powerful CPUs used for computations
B) They are groups of commercial computers linked by a network
C) They are processors designed solely for graphics
D) They use massively parallel processors for computations

**6. What does the control unit in a SIMD system do?**

A) It assigns individual tasks to processors
B) It processes all data sequentially
C) It provides identical instructions to all processors
D) It performs all computations independently

**7. Execution of several activities at the same time.**

a) processing
b) parallel processing
c) serial processing
d) multitasking

**8. Parallel processing has single execution flow.**

a) True
b) False

**9. A term for simultaneous access to a resource, physical or logical.**

a) Multiprogramming
b) Multitasking
c) Threads
d) Concurrency

**10. ______ leads to concurrency.**

a) Serialization
b) Parallelism
c) Serial processing
d) Distribution

**11. Several instructions execution simultaneously in _________**

a) processing mm
b) parallel processing
c) serial processing
d) multitasking

**12. Multiprocessing allows single processor to run several concurrent threads.**

a) True
b) False

**13. A parallel computing system consists of multiple processor that communicate with each other using a ___.**

A) Allocated memory

B) Shared memory

C) Network

D) None of the above

**14. In parallel computing systems, as the number of processors increases, with enough parallelism available in applications.**

A) True

B) False

**15. Parallel computing can be used in ___**

A) Science and engineering

B) Database and data mining

C) Real time simulation of systems

D) All of the above

**16. What is the primary goal of parallel programming?**

A) To reduce code complexity

B) To enhance performance and efficiency

C) To simplify debugging

D) To increase memory usage

**17. What type of parallelism involves executing different tasks concurrently?**

A) Data parallelism

B) Task parallelism

C) Sequential programming

D) Synchronous programming

**18. Which type of parallelism divides data into smaller chunks?**

A) Task parallelism

B) Data parallelism

C) Process parallelism

D) Thread parallelism

**19. What is the Global Interpreter Lock (GIL) primarily a limitation for?**

A) I/O-bound tasks

B) CPU-bound tasks

C) Networking tasks

D) Memory-bound tasks

**20. Which Python library is suitable for I/O-bound tasks?**

A) multiprocessing

B) concurrent.futures

C) threading

D) numpy

**21. What is the main advantage of multiprocessing over threading in Python?**

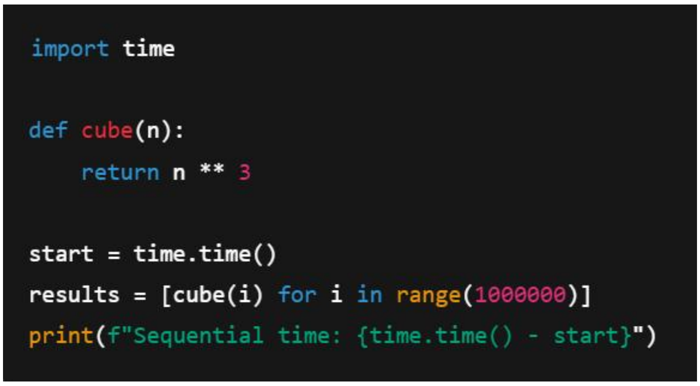
A) Simpler code

B) Bypasses the GIL

C) Easier debugging

D) More readable syntax

**22. Answer the following questions (i–iv) based on following code:**



```python
import time

def cube(n):
    return n ** 3

start = time.time()
results = [cube(i) for i in range(1000000)]
print(f"Sequential time: {time.time() - start}")
```

i. What does the function cube(n) do?

a) Calculates the square root of n

b) Calculates the cube of n

c) Calculates the factorial of n

d) Divides n by 3

ii. What is the nature of execution in the provided code?

a) Parallel

b) Multithreaded

c) Sequential

d) Distributed

iii. Why might this sequential execution be suboptimal on a modern multi-core CPU?

a) It uses too many threads

b) It uses multiprocessing instead of multithreading

c) It only uses a single core, leaving others idle

d) It creates too many processes

iv. What would be a benefit of parallelizing this code using multiprocessing?

a) It would reduce CPU usage

b) It would run slower but use less memory

c) It could run faster by utilizing multiple CPU cores

d) It would make the result more accurate

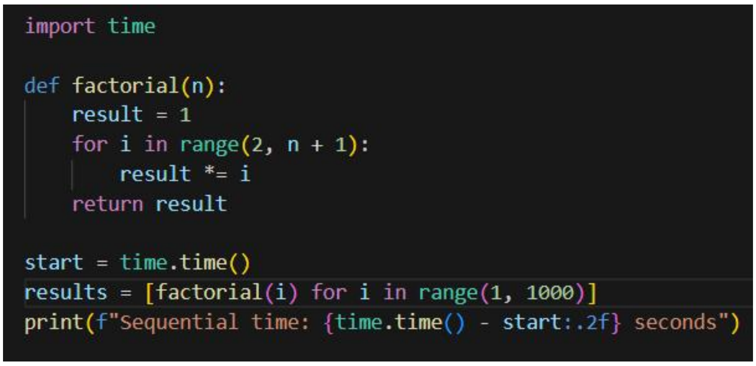
**23. What kind of task is this and how could it be optimized?**

a) I/O-bound, using less memory

b) CPU-bound, using multiprocessing to split the range

c) Memory-bound, using generators

d) GPU-bound, moving it to CUDA



```
import time

def factorial(n):
    result = 1
    for i in range(2, n + 1):
        result *= i
    return result

start = time.time()
results = [factorial(i) for i in range(1, 1000)]
print(f"Sequential time: {time.time() - start:.2f} seconds")
```

**24. What is the drawback of sequential programming?**

A) Inefficient for large tasks

B) Hard to implement

C) Complex syntax

D) Limited readability

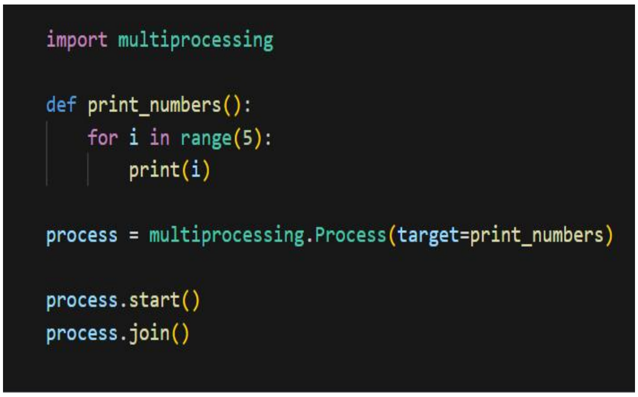
**25. In the example, what does the multiprocessing module utilize?**

A) Multiple threads

B) Multiple cores

C) Single-core execution

D) Networked processes



```
import multiprocessing

def print_numbers():
    for i in range(5):
        print(i)

process = multiprocessing.Process(target=print_numbers)

process.start()
process.join()
```

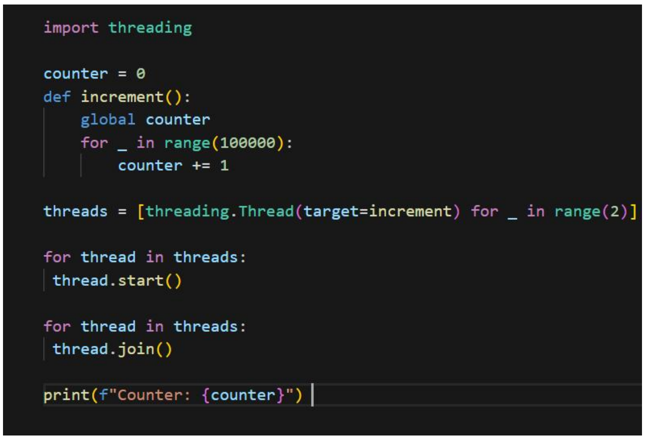
**26. What is the result of executing the threading example provided below?**

A) Improved CPU-bound performance

B) May not achieve expected counter value

C) Counter always reaches 200,000

D) Faster execution due to GIL



```
import threading

counter = 0
def increment():
    global counter
    for _ in range(100000):
        counter += 1

threads = [threading.Thread(target=increment) for _ in range(2)]

for thread in threads:
  thread.start()

for thread in threads:
  thread.join()

print(f"Counter: {counter}")
```

**27. What happens when CPU-bound tasks are executed with threading in Python?**

A) True parallelism is achieved

B) Limited performance due to GIL

C) Faster execution than multiprocessing

D) Multiple threads run at a time

**28. Why is multiprocessing more effective for CPU-bound tasks?**

A) Simpler than threading

B) Utilizes multiple CPU cores

C) Automatically handles I/O-bound tasks

D) Prevents data chunking

**29. What is the primary limitation of sequential programming?**

A) Requires advanced hardware

B) Cannot handle large datasets

C) Cannot utilize modern multi-core processors effectively

D) Poor readability

**30. How can the GIL affect multi-threaded CPU-bound tasks?**

A) Allows true parallelism

B) Improves performance

C) Limits performance

D) Automatically manages resources

**31. Which statement best describes task parallelism?**

A) Performing the same operation on all data chunks concurrently

B) Dividing tasks into smaller units for simultaneous execution

C) Using a single thread for all tasks

D) Processing tasks sequentially

**32. What is the purpose of the join() method in threading?**

A) To start a thread

B) To terminate a thread

C) To wait for a thread to finish execution

D) To create a new thread

**33. In Python, what is the main advantage of using multiprocessing over threading?**

A) Works seamlessly with the GIL

B) Does not require chunking of data

C) Supports true parallelism

D) Best suited for I/O-bound tasks

**34. Why do threads share the same memory space?**

A) to avoid memory leaks

B) to make communication between threads more efficient

C) to make them faster than processes

D) to increase CPU load

**35. What does asynchronous programming primarily allow?**

A) Multi-threading

B) Non-blocking operations

C) Real-time execution

D) Sequential processing

**36. What makes debugging parallel programs more difficult than sequential programs?**

A) More code

B) Network issues

C) Race conditions and synchronization issues

D) Compiler errors

**37. Which tool helps identify bottlenecks in parallel Python code?**

A) Task manager

B) PyLint

C) cProfile

D) DebugPy

**38. Which threading issue can occur even if there is no deadlock?**

A) Starvation

B) Syntax error

C) Infinite loop

D) Memory leak

**39. What is the function of massively parallel processing (MPP)?**

A) Simplify small-scale computations

B) Process immense datasets rapidly

C) Restrict communication between processors

D) Operate without messaging interface

**40. Which is better for CPU-bound tasks, threading or multiprocessing?**

A) threading

B) multiprocessing

C) both are the same

D) neither is useful

**41. What is the main use case for multiprocessing?**

A) running CPU-intensive tasks in parallel
B) running multiple threads in parallel
C) running simple print statements
D) running a single-threaded server

**42. Why use queues in multiprocessing?**

A) to avoid shared memory conflicts
B) to store large amounts of data
C) to increase CPU speed
D) to replace threading

**43. Which keyword is used to define a coroutine?**

A) coroutine
B) async def
C) def async
D) await def

**44. What does asyncio.create_task() do?**

A) Runs a coroutine immediately
B) Blocks all tasks
C) Creates a new thread
D) Schedules a coroutine to run

**45. What is a multiprocessing.Value used for?**

A) to store a single shared variable
B) to create a new thread
C) to store an array of values
D) to increase CPU performance

**46. What does a multiprocessing.Array store?**

A) a list of shared values
B) a single variable
C) a queue of tasks
D) a process lock

**47. What is a Future in asyncio?**

A) A completed coroutine
B) A coroutine scheduler
C) A placeholder for a result that will be available later
D) A thread manager

**48. Which asyncio function is suitable for background coroutine execution?**

A) asyncio.wait()

B) asyncio.create_task()

C) asyncio.timeout()

D) asyncio.defer()

**49. Which is not a benefit of asyncio?**

A) High thread overhead

B) Efficient task switching

C) Handles thousands of operations

D) Single-threaded

**50. What is a race condition?**

A) A task that runs faster than others

B) A condition where threads work cooperatively

C) Concurrent access to shared data without synchronization

D) Waiting for a lock indefinitely

**51. What is the correct way to create a thread in Python?**

A) thread = Threading.Process(target=function_name)

B) thread = threading.Thread(target=function_name)

C) thread = multiprocessing.Thread(target=function_name)

D) thread = process.Thread(target=function_name)

**52. What does thread.join() do?**

A) stops the thread

B) waits for the thread to finish execution

C) permanently blocks all other threads

D) restarts the thread

**53. What are the main stages of a thread's lifecycle?**

A) creation → running → execution → termination

B) running → execution → restart → termination

C) initialization → stop → kill → resume

D) loading → execution → pause → end

**54. Why do we need thread synchronization?**

A) to execute multiple threads in parallel

B) to prevent race conditions when accessing shared resources

C) to increase the number of threads

D) to reduce memory usage

**55. What causes a deadlock?**

A) Infinite loop

B) Incorrect output

C) Circular waiting on locks

D) Missing function

**56. What role does message passing play in SPMD systems?**

A) It eliminates the need for task synchronization

B) It facilitates communication between distributed memory nodes

C) It accelerates computation by bypassing processor coordination

D) It reduces the number of processors required

**57. What is a major problem with CPU cycles in personal computers?**

A) they are too slow

B) most CPU cycles are wasted

C) they cannot execute parallel tasks

D) they consume too much memory

**58. What does a multi-core processor do?**

A) reduces processor speed

B) acts as multiple CPUs in one

C) uses only one core at a time

D) prevents parallel execution

**59. What is the effect of adding processors beyond the break-point?**

A) speedup increases exponentially

B) speedup stays the same

C) speedup increases slightly

D) processing speed decreases

**60. When is it beneficial to add more processors?**

A) When below the break-point

B) When above the break-point

C) When running only serial tasks

D) When CPU usage is low

**61. What is the purpose of inter-cluster connections in grid computing?**

A) to improve data transfer between clusters

B) to slow down processing speed

C) to increase power consumption

D) to reduce the number of processors

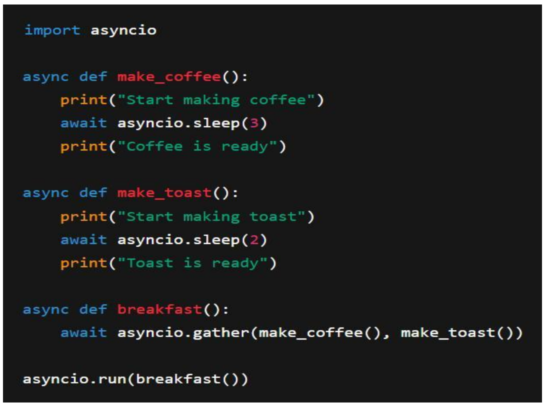
**62. What is a livelock?**
A) Threads are idle
B) Threads complete tasks early
C) Threads work but make no progress
D) Code crashes randomly

**63. What happens if you await a Future?**
A) It runs immediately
B) It throws an error
C) It waits until .set_result() is called
D) It restarts the event loop

**64. What is the difference between a Task and a Future?**
A) Tasks are synchronous
B) Tasks auto-schedule coroutines; Futures don't
C) Tasks are lower-level
D) Futures can't be awaited

**65. What method manually sets a Future's result?**
A) future.complete()
B) future.set_value()
C) future.set_result()
D) future.done()

**66. What prints first in breakfast()?**
A) Coffee is ready
B) Start making toast
C) Toast is ready
D) Start making coffee



```
import asyncio

async def make_coffee():
    print("Start making coffee")
    await asyncio.sleep(3)
    print("Coffee is ready")

async def make_toast():
    print("Start making toast")
    await asyncio.sleep(2)
    print("Toast is ready")

async def breakfast():
    await asyncio.gather(make_coffee(), make_toast())

asyncio.run(breakfast())
```

**67. Which is more efficient for managing many I/O tasks?**
A) Threading
B) asyncio
C) multiprocessing
D) fork

**68. Which function pauses a coroutine without blocking the event loop?**

A) time.sleep()

B) asyncio.pause()

C) asyncio.sleep()

D) asyncio.stop()

**69. Which synchronization technique allows only one thread to execute at a time?**

A) semaphore

B) lock

C) event

D) threadpool

**70. What is the main purpose of using a semaphore?**

A) to limit the number of threads that can access a resource

B) to block thread execution

C) to allow unlimited access to threads

D) to execute all threads sequentially

**71. How do you create a lock in Python?**

A) lock = threading.Semaphore()

B) lock = threading.Lock()

C) lock = threading.ThreadLock()

D) lock = threading.Mutex()

**72. What does executor.map() do?**

A) applies a function to multiple arguments in parallel

B) creates a new process pool

C) starts only one process

D) terminates the executor

**73. What does executor.submit() do in a process pool?**

A) submits a function to be executed asynchronously

B) starts a new process

C) blocks execution until all tasks finish

D) terminates all processes

**74. Which module provides ProcessPoolExecutor?**

A) os

B) threading

C) concurrent.futures

D) multiprocessing

**75. What are the benefits of a process pool?**

A) reuses processes for multiple tasks
B) eliminates the need for CPUs
C) creates new CPU cores
D) makes multiprocessing unnecessary

**76. In asyncio, what is a coroutine?**

A) Threaded task
B) Class instance
C) Async function object
D) Event handler

**77. When should you use asyncio.Future?**

A) When you want automatic coroutine execution
B) For manual control of async results
C) For writing sync code
D) For running multiple tasks

**78. Which of the following is a correct syntax?**

A) await def greet():
B) def async greet():
C) async def greet():
D) coroutine greet():

**79. What does thread starvation mean?**

A) Threads consume too much CPU
B) Threads never complete
C) Some threads never get CPU time
D) Threads block on I/O

**80. What's the best way to avoid deadlocks when using multiple locks?**

A) Use a single lock only
B) Acquire locks randomly
C) Always acquire locks in the same order
D) Release locks immediately

**81. What module is commonly used in Python for profiling performance?**

A) profiler
B) asyncio
C) timeit
D) cProfile

**82. What does ncalls mean in cProfile output?**

A) CPU usage
B) Number of function calls
C) Network calls
D) None of the above

**83. What is a process pool?**

A) a collection of pre-initialized processes
B) a shared memory space
C) a queue for processes
D) a list of threads

**84. What does lock.release() do?**

A) unlocks the shared resource
B) starts a new process
C) stops all running processes
D) deletes the lock

**85. What is tottime in cProfile?**

A) Total runtime of program
B) Time in sub-calls
C) Time spent in the function itself
D) Unused time

**86. What happens if multiple threads access shared data without synchronization?**

A) efficiency improves
B) race conditions occur
C) threads get automatic priority
D) execution speeds up

**87. What does with lock: do in threading?**

A) acquires and releases the lock automatically
B) starts a new thread
C) terminates a thread
D) creates a new process

**88. What is cumtime in profiling results?**

A) Total cumulative time including sub-calls
B) Time without sub-calls
C) Time per line
D) Error time

**89. Which of the following is a thread-safe data structure?**
A) List
B) Dictionary
C) Queue
D) Set

**90. What is the purpose of threading.Lock()?**
A) Create threads
B) Delay execution
C) Synchronize access to shared resources
D) Improve speed

**91. What's the issue if your program hangs during thread join()?**
A) Logical error
B) Deadlock
C) Syntax error
D) Infinite recursion

**92. Which of these is NOT a parallel programming bug?**
A) Livelock
B) Starvation
C) Deadlock
D) Breakpoint

**93. What makes a coroutine concurrent?**
A) async/await
B) Threads
C) GIL
D) Main loop

**94. Which will run first if both tasks are started at the same time?**
A) One with shortest await duration
B) Random
C) Longest one
D) Last declared

**95. What is an event in threading?**
A) a function that permanently stops threads
B) a mechanism that makes threads wait until a condition is met
C) a way to create a new thread
D) a method to stop threads

**96. Which function is used to set an event?**

A) event.activate()

B) event.set()

C) event.wait()

D) event.run()

**97. What does a multiprocessing.Lock do?**

A) prevents multiple processes from accessing shared data at the same time

B) creates a new process

C) blocks all memory access

D) increases CPU performance

**98. Why is synchronization needed in multiprocessing?**

A) to prevent race conditions

B) to increase process execution time

C) to allow simultaneous memory access

D) to block all other processes

**99. What are two shared memory objects in Python's multiprocessing?**

A) value and array

B) queue and pipe

C) lock and semaphore

D) thread and event

**100. What is shared memory in multiprocessing?**

A) memory that all processes can access directly

B) memory assigned to one thread

C) a type of process pool

D) a way to store logs