Course: Introduction to Programming
Code: CS101
Semester: Spring 2023

Sample Questions:

1. What is a variable in programming?
   a) A constant value
   b) A storage location
   c) An arithmetic operation
   d) A type of loop

2. Which language is compiled?
   a) Python
   b) JavaScript
   c) Java
   d) HTML

3. How do you print "Hello, World!" in Python?
   a) echo "Hello, World!"
   b) printf("Hello, World!")
   c) System.out.println("Hello, World!")
   d) print("Hello, World!")

4. What is the keyword for defining a function in Python?
   a) func
   b) function
   c) def
   d) define

5. Which of these is an example of recursion?
   a) Looping through a list
   b) A function calling itself
   c) Declaring a variable
   d) Importing a module

6. What does a 'for' loop do?
   a) Executes a block of code once
   b) Executes a block of code multiple times
   c) Checks a condition
   d) Defines a function

7. How are exceptions handled in Python?
   a) Using try and except blocks

b) Using if and else blocks
c) Using for and while loops
d) Using print statements

8. What is the correct way to create a list in Python?
a) {1, 2, 3}
b) (1, 2, 3)
c) [1, 2, 3]
d) <1, 2, 3>

9. How do you define a dictionary in Python?
a) {key1: value1, key2: value2}
b) [key1: value1, key2: value2]
c) (key1: value1, key2: value2)
d) <key1: value1, key2: value2>

10. How do you define a class in Python?
a) class MyClass {}
b) class MyClass
c) class MyClass():
d) class MyClass[]:

11. What is inheritance in programming?
a) Creating variables
b) Creating functions
c) One class acquiring properties of another
d) Importing modules

12. How do you import a module in Python?
a) import module_name
b) include module_name
c) load module_name
d) using module_name

13. Which function is used to read a file in Python?
a) read()
b) open()
c) file()
d) readfile()

14. What is the difference between local and global variables?
a) Scope
b) Type
c) Size

d) Value

15. What determines the scope of a variable?
   a) Variable name
   b) Variable type
   c) Location of variable declaration
   d) Value assigned to the variable

16. How do you find the factorial of a number in Python?
   a) factorial(n)
   b) fact(n)
   c) math.factorial(n)
   d) compute_factorial(n)

17. What is a lambda function?
   a) Anonymous function
   b) Named function
   c) Loop
   d) Conditional statement

18. What are decorators used for in Python?
   a) Modifying the behavior of a function or method
   b) Declaring variables
   c) Looping through elements
   d) Handling exceptions

19. How do you reverse a string in Python?
   a) reverse(str)
   b) str[::-1]
   c) rev(str)
   d) reverse_string(str)

20. What is a list comprehension?
   a) Syntax for creating a list
   b) Looping construct
   c) Function
   d) Data type

21. What is a generator in Python?
   a) Function that returns an iterator
   b) Class that creates objects
   c) Variable declaration
   d) Loop construct

22. What is the difference between shallow copy and deep copy?
   a) Memory allocation
   b) Time complexity
   c) Reference copying vs. object copying
   d) Syntax

23. How do you merge two dictionaries in Python?
   a) dict1 + dict2
   b) dict1.update(dict2)
   c) dict1.extend(dict2)
   d) dict1.merge(dict2)

24. What does the `map()` function do?
   a) Applies a function to all items in an iterable
   b) Creates a dictionary
   c) Sorts a list
   d) Finds an item in a list

25. How do you check if a number is prime in Python?
   a) is_prime(number)
   b) prime(number)
   c) check_prime(number)
   d) math.is_prime(number)

26. What is the purpose of the `self` keyword in a class?
   a) Refer to instance attributes and methods
   b) Refer to global variables
   c) Refer to local variables
   d) Refer to static methods

27. What is polymorphism in programming?
   a) Multiple functions with the same name
   b) One class inheriting from another
   c) Multiple classes with the same name
   d) Different data types with the same interface

28. How do you sort a list of numbers in Python?
   a) sort(list)
   b) list.sort()
   c) sorted(list)
   d) sort_list(list)

29. What is the `__init__` method used for in a class?
   a) Initialize the object's state

b) Destroy the object's state
c) Create a new class
d) Import modules

30. What does the `filter()` function do in Python?
a) Filters elements from an iterable
b) Creates a list
c) Sorts a list
d) Finds an element

31. How do you find the GCD of two numbers in Python?
a) gcd(a, b)
b) math.gcd(a, b)
c) find_gcd(a, b)
d) compute_gcd(a, b)

32. What are docstrings used for?
a) Documenting code
b) Declaring variables
c) Creating loops
d) Importing modules

33. What is method overloading?
a) Multiple methods with the same name but different parameters
b) One method calling another
c) Multiple classes with the same method
d) Importing methods from modules

34. How do you find the second largest number in a list in Python?
a) second_largest(list)
b) find_second_largest(list)
c) sorted(list)[-2]
d) list[-2]

35. What is the `with` statement used for?
a) Handling file operations
b) Creating loops
c) Declaring variables
d) Defining functions

36. What is a set in Python?
a) Unordered collection of unique elements
b) Ordered collection of elements
c) Mutable list

d) Immutable list

37. How do you count the number of vowels in a string?
   a) count_vowels(str)
   b) find_vowels(str)
   c) vowel_count(str)
   d) sum(1 for char in str if char in "aeiou")

38. What is the difference between `is` and `==`?
   a) Object identity vs. value equality
   b) Value equality vs. type equality
   c) Type equality vs. object identity
   d) Object identity vs. type equality

39. What is duck typing?
   a) Type checking based on methods and properties
   b) Strict type checking
   c) Type inference
   d) Runtime type checking

40. How do you flatten a nested list in Python?
   a) flatten(list)
   b) sum(list, [])
   c) nested_to_flat(list)
   d) flat(list)

41. What are magic methods in Python?
   a) Special methods with double underscores
   b) Methods for type conversion
   c) Methods for mathematical operations
   d) Methods for string manipulation

42. What does the `reduce()` function do?
   a) Applies a function cumulatively to the items in an iterable
   b) Filters elements from an iterable
   c) Sorts elements in an iterable
   d) Maps a function to the items in an iterable

43. How do you find the sum of digits of a number in Python?
   a) sum_digits(number)
   b) sum(map(int, str(number)))
   c) sum_of_digits(number)
   d) compute_sum_of_digits(number)

44. What is the difference between `append()` and `extend()`?
  a) Add single element vs. add multiple elements
  b) Add multiple elements vs. add single element
  c) Add elements at the beginning vs. add elements at the end
  d) Remove elements vs. add elements

45. What is multiple inheritance?
  a) A class inheriting from multiple classes
  b) A class inheriting from one class
  c) Multiple classes inheriting from one class
  d) One class inheriting from multiple instances

46. How do you find the length of a string without using `len()`?
  a) length(str)
  b) str_length(str)
  c) sum(1 for char in str)
  d) len_string(str)

47. What does the `zip()` function do?
  a) Combines elements from multiple iterables
  b) Sorts elements in an iterable
  c) Filters elements from an iterable
  d) Maps a function to the items in an iterable

48. What is an iterator in Python?
  a) Object that can be iterated upon
  b) Function that returns a sequence of numbers
  c) List of elements
  d) String of characters

49. How do you remove duplicates from a list in Python?
  a) list(set(list))
  b) remove_duplicates(list)
  c) unique_list(list)
  d) deduplicate(list)

50. What is the difference between `pop()` and `remove()`?
  a) Remove by index vs. remove by value
  b) Remove by value vs. remove by index
  c) Add element vs. remove element
  d) Modify element vs. remove element

51. What does the `enumerate()` function do?
  a) Adds a counter to an iterable

b) Creates a list
c) Sorts a list
d) Filters elements from a list

52. How do you convert a list of strings to a single string?
a) ''.join(list)
b) str(list)
c) join(list)
d) concat(list)

53. What is the `pass` statement used for?
a) Placeholder for future code
b) Declaring variables
c) Creating loops
d) Importing modules

54. What is a metaclass in Python?
a) Class of a class
b) Function of a function
c) Variable of a variable
d) Method of a method

55. How do you find the most frequent element in a list?
a) max(set(list), key=list.count)
b) frequent_element(list)
c) list.most_frequent()
d) common_element(list)

56. What is the `break` statement used for?
a) Exiting a loop
b) Creating a loop
c) Declaring a variable
d) Importing a module

57. What is list slicing?
a) Extracting a portion of a list
b) Adding elements to a list
c) Removing elements from a list
d) Sorting a list

58. How do you convert a string to a list of characters?
a) list(str)
b) split(str)
c) str_list(str)

d) chars(str)

59. What is the difference between `range()` and `xrange()` in Python 2?
a) `range()` returns a list, `xrange()` returns an iterator
b) `range()` returns an iterator, `xrange()` returns a list
c) `range()` returns a string, `xrange()` returns a list
d) `range()` returns a list, `xrange()` returns a string

60. What is a context manager?
a) Manages resources within a block of code
b) Creates loops
c) Declares variables
d) Imports modules

61. How do you find the sum of a list of numbers?
a) sum(list)
b) list.sum()
c) add(list)
d) total(list)

62. What is the `continue` statement used for?
a) Skipping the rest of the loop iteration
b) Exiting a loop
c) Declaring a variable
d) Importing a module

63. What is a named tuple?
a) Tuple with named fields
b) List with named fields
c) Dictionary with named fields
d) Set with named fields

64. How do you check if a string is a palindrome?
a) str == str[::-1]
b) palindrome(str)
c) is_palindrome(str)
d) check_palindrome(str)

65. What is the difference between a method and a function?
a) Method is associated with an object, function is not
b) Function is associated with an object, method is not
c) Method is a type of function
d) Function is a type of method

66. What is slicing in strings?
  a) Extracting a portion of a string
  b) Adding characters to a string
  c) Removing characters from a string
  d) Sorting a string

67. How do you calculate the Fibonacci sequence in Python?
  a) fibonacci(n)
  b) fib(n)
  c) fib_sequence(n)
  d) fibonacci_sequence(n)

68. What is the `assert` statement used for?
  a) Testing conditions
  b) Declaring variables
  c) Creating loops
  d) Importing modules

69. What is a binary search algorithm?
  a) Search algorithm that divides the search interval in half
  b) Search algorithm that checks every element
  c) Search algorithm that uses hashing
  d) Search algorithm that uses recursion

70. How do you merge two sorted lists in Python?
  a) merge_sorted(list1, list2)
  b) sorted(list1 + list2)
  c) merge(list1, list2)
  d) list1.merge(list2)

71. What is the difference between `sorted()` and `sort()`?
  a) `sorted()` returns a new list, `sort()` modifies the list in place
  b) `sorted()` modifies the list in place, `sort()` returns a new list
  c) `sorted()` sorts in ascending order, `sort()` sorts in descending order
  d) `sorted()` sorts in descending order, `sort()` sorts in ascending order

72. What is recursion depth?
  a) Maximum number of nested function calls
  b) Maximum number of loop iterations
  c) Maximum number of variable declarations
  d) Maximum number of imported modules

73. How do you find the median of a list of numbers in Python?
  a) median(list)

b) statistics.median(list)
c) find_median(list)
d) list.median()

74. What is the `all()` function used for?
a) Check if all elements in an iterable are true
b) Check if any elements in an iterable are true
c) Sort elements in an iterable
d) Filter elements in an iterable

75. What is a hash table?
a) Data structure that maps keys to values
b) Data structure that sorts elements
c) Data structure that filters elements
d) Data structure that stores elements sequentially

76. How do you find the intersection of two lists in Python?
a) set(list1) & set(list2)
b) intersection(list1, list2)
c) list1.intersection(list2)
d) intersect(list1, list2)

77. What is the difference between `any()` and `all()`?
a) `any()` checks if any elements are true, `all()` checks if all elements are true
b) `all()` checks if any elements are true, `any()` checks if all elements are true
c) `any()` sorts elements, `all()` filters elements
d) `all()` sorts elements, `any()` filters elements

78. What is memoization?
a) Storing results of expensive function calls
b) Sorting elements in an iterable
c) Filtering elements in an iterable
d) Mapping elements in an iterable

79. How do you find the mode of a list of numbers in Python?
a) statistics.mode(list)
b) mode(list)
c) find_mode(list)
d) list.mode()

80. What does the `dir()` function do in Python?
a) Lists the attributes and methods of an object
b) Declares variables
c) Creates loops

d) Imports modules

81. What is a linked list?
a) Data structure consisting of nodes connected by pointers
b) Data structure consisting of elements stored sequentially
c) Data structure consisting of elements stored in a hash table
d) Data structure consisting of elements stored in a tree

82. How do you find the union of two lists in Python?
a) set(list1) | set(list2)
b) union(list1, list2)
c) list1.union(list2)
d) combine(list1, list2)

83. What is the difference between `isinstance()` and `issubclass()`?
a) `isinstance()` checks if an object is an instance of a class, `issubclass()` checks if a class is a subclass of another class
b) `issubclass()` checks if an object is an instance of a class, `isinstance()` checks if a class is a subclass of another class
c) `isinstance()` checks if a class is a subclass of another class, `issubclass()` checks if an object is an instance of a class
d) `issubclass()` checks if a class is a subclass of another class, `isinstance()` checks if an object is an instance of a class

84. What is a binary tree?
a) Tree data structure with each node having at most two children
b) Tree data structure with each node having at most three children
c) Tree data structure with each node having exactly two children
d) Tree data structure with each node having exactly three children

85. How do you implement a stack in Python?
a) Using a list
b) Using a set
c) Using a dictionary
d) Using a tuple

86. What does the `help()` function do in Python?
a) Provides documentation for objects
b) Declares variables
c) Creates loops
d) Imports modules

87. What is a queue?
a) Data structure with FIFO (First In, First Out) order

b) Data structure with LIFO (Last In, First Out) order
c) Data structure with random access
d) Data structure with sequential access

88. How do you implement a queue in Python?
a) Using collections.deque
b) Using a list
c) Using a set
d) Using a dictionary

89. What is the difference between a stack and a queue?
a) Stack is LIFO, queue is FIFO
b) Stack is FIFO, queue is LIFO
c) Stack allows random access, queue allows sequential access
d) Stack allows sequential access, queue allows random access

90. What is breadth-first search (BFS)?
a) Search algorithm that explores nodes level by level
b) Search algorithm that explores nodes depth by depth
c) Search algorithm that uses hashing
d) Search algorithm that uses recursion

91. How do you implement a binary search tree in Python?
a) Using a class
b) Using a list
c) Using a set
d) Using a dictionary

92. What is the difference between DFS and BFS?
a) DFS explores depth first, BFS explores level first
b) BFS explores depth first, DFS explores level first
c) DFS uses hashing, BFS uses recursion
d) BFS uses hashing, DFS uses recursion

93. What is depth-first search (DFS)?
a) Search algorithm that explores nodes depth by depth
b) Search algorithm that explores nodes level by level
c) Search algorithm that uses hashing
d) Search algorithm that uses recursion

94. How do you perform a binary search in Python?
a) Using a while loop and comparing middle elements
b) Using a for loop and comparing middle elements
c) Using recursion and comparing middle elements

d) Using iteration and comparing middle elements

95. What does the `id()` function do in Python?
a) Returns the unique identifier of an object
b) Declares variables
c) Creates loops
d) Imports modules

96. What is dynamic programming?
a) Method for solving complex problems by breaking them down into simpler subproblems
b) Method for sorting elements
c) Method for filtering elements
d) Method for mapping elements

97. How do you implement a priority queue in Python?
a) Using heapq module
b) Using a list
c) Using a set
d) Using a dictionary

98. What is the difference between a min-heap and a max-heap?
a) Min-heap has the smallest element at the root, max-heap has the largest element at the root
b) Min-heap has the largest element at the root, max-heap has the smallest element at the root
c) Min-heap sorts elements in descending order, max-heap sorts elements in ascending order
d) Min-heap sorts elements in ascending order, max-heap sorts elements in descending order

99. What is a graph in computer science?
a) Data structure consisting of nodes and edges
b) Data structure consisting of elements stored sequentially
c) Data structure consisting of elements stored in a hash table
d) Data structure consisting of elements stored in a tree

100. How do you find the shortest path in a graph?
a) Using Dijkstra's algorithm
b) Using DFS
c) Using BFS
d) Using recursion