The topics covered by the test.

* Priority Queue - different implementations and applications based on:
  + unsorted array
  + sorted array
  + binary heap
* Operations and their running times for each representation
  + inserting a new element into a priority queue
  + deleting/removing the minimum value from a priority queue
  + getting/reading the minimum value from a priority queue
  + creating a priority queue
* Sorting Algorithms
  + Sorting algorithms based on the priority queue
    - insertion sort
    - selection sort
    - heap sort
  + Non-comparison based sorting algorithms: radix and counting sort
* Greedy algorithms: file compression and graphs based on a minimum  priority queue
  + The Huffman code for file compression.
  + The Dijkstra's algorithm for the shortest path problem in a graph
  + The Prim's and Kruskal's algorithms for a minimum spanning tree in a graph
* Dictionary
  + Binary search trees (BST):
  + Traversal operations: in-order, pre-order and post-order
  + Creating a tree; inserting and deleting a tree; finding max value in a tree; removing max value from a tree
  + Balancing techniques: AVL, Red Black and 2-4 trees
  + Sorting algorithms based on BST
  + **Running times for all the above operations**
  + Skip lists, and their purpose, operations and their running times.
  + Hashing - different methods for resolving collisions, average time for inserting, searching and deleting operations, assumptions about a hash table and hash functions in order to achieve better performance.
    - open addressing: linear probing and double hashing
    - chaining
* Graphs:
  + Definition, terminology and implementations
  + Graph traversal operations:
    - BFS in a graph
    - DFS in a graph
  + The single source shortest path problem for weighted graphs
    - The Dijkstra's algorithm and theorem
      * Running time for different representations of graphs (dense, sparse) and priority queues
      * applications
    - The Bellman-Ford's algorithm for a graph with negative weights, running times and applications
    - The shortest path algorithm for DAG (directed acyclic graph), running times and applications
    - Applications
  + The minimum spanning tree problem
    - The Prim's algorithm
      * Illustration of the algorithm
      * Running times for different representations of graphs and priority queues
    - The Kruskal's algorithm
      * Illustration of the algorithm
      * Running times for different representations of graphs and priority queues
      * Applications