

**CS3353: Data Structures and Algorithm Analysis I**  
**Fall 2022**

**Exam #3 Review**

1. Multiway trees & B-tree of order  $m$ 
  - 3 cases of inserting a key
    - the leaf has room
    - the leaf is full
    - the leaf and the root of leaf are full

Q: draw the structure of B-tree after inserting a key
2. Concepts/terminologies of graph
  - graph
  - direct/undirect graph
  - multi graph / pseudo graph
  - path
  - weighted graph
  - complete graph
  - degree

Q: multiple choice and/or true & false
3. Graph representation
  - adjacency list
  - adjacency matrix
  - differences between them
  - choose reasonable representation for specific situation

Q: multiple choice and/or true & false
4. Depth-first search (DFS)
  - the idea of DFS

Q: given a graph, apply DFS, provide searching result
5. Breadth-first search (BFS)
  - the idea of BFS

Q: given a graph, apply BFS, provide searching result
6. Dijkstra shortest path
  - the idea of Dijkstra

Q: given a graph, apply Dijkstra, provide shortest path and cost from source to every other node. Use table to answer question
7. Acyclic graph/topological ordering
  - concepts/terminologies of acyclic graph
  - applications of topological ordering

Q: multiple choice and/or true & false
8. Sorting algorithms
  - the idea of insertion / selection / bubble / shell / heap / merge sorts

Q: multiple choice and/or true & false

Q: given a set of numbers, draw sorting process
9. Hashing
  - hash table, hash function, collision
  - hash functions: division modulo, folding, mid-square
  - collision resolution: linear probing

Q: true & false; hashing & collision resolution calculation