K.R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

Course: Data Structure

(Course Code : ENCS205)

UNIT-1: Foundations of Data Structures

School of Engineering & Technology
K.R. Mangalam University

REVISION

Multiple Choice Questions

Quiz

Q1 What is a data structure?

a) A programming language

b) A collection of algorithms

c) A way to store and organize data

d) A type of computer hardware

Q2 What is a bit array?

a) Data structure that compactly stores bits

b) Data structure for representing arrays of records

c) Array in which elements are not present in continuous locations

d) An array in which most of the elements have the same value

Multiple Choice Questions (Cont..)

Q3 Which data structure is based on the Last In First Out (LIFO) principle?

a) Tree
b) Linked List
c) Stack
d) Queue

Q4 Which of the following is not the type of queue?

a) Priority queue
b) Circular queue
c) Single ended queue
d) Ordinary queue

Multiple Choice Questions (Cont..)

Q5 A queue is a?
a) FIFO (First In First Out) list
b) LIFO (Last In First Out) list.
c) Ordered array
d) Linear tree

Q6 In Breadth-First Search of Graph, which of the following data structure is used?
a) Stack
b) Queue
c) Linked list
d) None

Multiple Choice Questions (Cont..)

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Multiple Choice Questions (Cont..)

Q7 Dynamic data structures are preferred when:
a) Memory usage needs to be optimized
b) The size of the data is fixed
c) Memory allocation is done at compile time
d) The size of the data may vary during program execution

Q8 Which data structure allows for dynamic resizing?
a) Array
b) Stack
c) Linked list
d) Binary search tree

Multiple Choice Questions (Cont..)

Q9 Resizing in dynamic data structures involves:
a) Allocating a new memory block and copying data
b) Adjusting a fixed-size memory block
c) Shrinking the memory block to save space
d) Deleting elements randomly from the structure

Q10 Which of the following scenarios would be best suited for a static data structure?
a) Storing data in a web server cache
b) Managing a list of user accounts in a social media platform
c) Representing the pixels of an image
d) Implementing a stack for function calls in a program

Answer the following:

Q1 Explain the concept of memory allocation in static and dynamic data structures.

Q2 Explain the concept of resizing in dynamic data structures. Why is it important?

Q3 How do dynamic arrays differ from static arrays?

Q4 Discuss the trade-offs between static and dynamic data structures in terms of performance and flexibility.

Q5 Describe a scenario where you would choose a static data structure over a dynamic one, and vice versa.

Answer the following:

Q6 What is a one-dimensional array, and how is it represented in memory?

Q7 Can you explain the concept of a multi-dimensional array? Provide an example.

Q8 Describe the difference between a static array and a dynamic array.

Q9 What is the time complexity of accessing an element in an array?

Q10 What is the significance of the "out of bounds" error in arrays?

Answer the following:

Q11 What is the time complexity of following code:

```
int c = 0;
for (x = 0; x < N; i++) {
for (y = N; y > x; y--) {
c = c + x + y;
}
}
```

Q12 What is the time complexity of following code:

```
int a = 0, i = N;
while (i > 0) {
a += i;
i /= 2;
}
```

Answer the following:

Q13 In what scenarios would you prioritize analyzing an algorithm's lower bounds using Big Omega notation over its upper bounds using Big O notation?

Q14 What are some common complexity classes associated with fundamental data structures like arrays, linked lists, and trees?

Q15 Can you convert this recursion function into a loop and how?

```
A(x)
{
If x<0 return 0;
return something (x)+A(x-1)
}
```

THANK YOU