**Maps and generics Assignments by gaurav diwan**

**Java with DSA and System design**

Q1] what is a map in java ?

Ans. A map in Java is an interface that represents a collection of key-value pairs. It does not allow duplicate keys and each key can map to at most one value.

Q2] what are the commonly used implementations of map in java?

Ans. 1. HashMap: Uses a hash table for storage.

2. TreeMap: Uses a red-black tree for ordered storage.

3. LinkedHashMap: Maintains order of insertion.

4. Hashtable: Similar to HashMap but is synchronized (legacy class).

5. ConcurrentHashMap: Thread-safe version of HashMap.

Q3] what is the difference between hashmap and treemap?

Ans. HashMap:

- Unordered collection.

- Uses a hash table for storage.

TreeMap:

- Ordered collection.

- Uses a red-black tree for ordered storage.

Q4] how do you check if a key exist in a map in java?

Ans. Use the **containsKey()** method:

Map<String, Integer> map = new HashMap<>();

boolean keyExists = map.containsKey("someKey");

Q5] what are the generics in java ?

Ans. Generics in Java allow the creation of classes, interfaces, and methods that operate on types. They provide compile-time type safety and enable the creation of reusable code with type parameters.

Q6] what are the benefits of using generics in java ?

Ans. 1. Type Safety: Detects and prevents type errors at compile time.

2. Code Reusability: Enables the creation of generic classes and methods.

3. Performance: Avoids the need for casting, improving runtime efficiency.

Q7] what is a generics class in java ?

Ans. A generics class in Java is a class that can work with different types using type parameters. It is defined with one or more type parameters, allowing the class to be used with various data types.

Q8] what is a type parameter in java generics ?

Ans. A type parameter in Java generics is a placeholder for a type that is specified when a generic class, interface, or method is instantiated or called. It allows the creation of classes or methods that operate on different types.

Q9] what is a generics method in java ?

Ans. A generics method in Java is a method that introduces its own type parameters. It allows the method to operate on parameters of different types, specified at the time of method invocation.

Q10] what is the difference between arraylist and arraylist<T>?

Ans. ArrayList: Represents a raw type without specifying a specific element type.

ArrayList<T>: Represents an ArrayList with a specific element type, providing type safety through generics.

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