CS3391 OBJECT ORIENTED PROGRAMMING

Question Bank

UNIT IV MULTITHREADING AND GENERIC PROGRAMMING

PART – A

1. What are threads?

Threads are light weight processes within a process. A thread of execution results from a fork of a computer program into two or more concurrently running tasks. Threads are analogous to program that have single flow of control.

2. What are the methods available to create a thread?

Threads in java are implemented in the form of objects and created using two methods.
They are,

- By extending thread class
- By implementing runnable interface

3. How will you block a thread?

A thread can be blocked temporarily by using the following methods.

- sleep()
- suspend()
- wait()

4. What is meant by multithreading and concurrency?

Multithreading is the process of creating and using multiple threads for different control flowing in a single java program.The ability of java to support multiple threads is referred as concurrency.

5. What are advantages of multithreading?

- If a thread gets a lot of cache misses, the other thread(s) can continue, taking advantage of the unused computing resources, Which thus can lead to faster overall execution, as these resources would have been idle if only a single thread was executed.
- If a thread cannot use all the computing resources of the CPU, running another thread permits to not leave this idle.
- If several threads work on the same set of data, they can actually share their cache, leading to better cache usage or synchronization on its values.

6. List the type of multithreading

1. Block multi-threading
2. Interleaved multi-threading
3. Simultaneous multi-threading

7. What are the ways available to interrupt a thread?

- Interrupting a thread using shared variables.
- Interrupting a thread with Thread. interrupt()

8. List the states of thread.

- New
- Runnable
- Not runnable
- Dead

9. When are thread considered to be blocked state?

- it's sleep() method is invoked
- it's wait() method is invoked
- it is blocked on input/output

10. Mention the thread priorities.

Thread. Max_PRIORITY	The maximum priority of any thread
Thread. Min_Priority	The minimum priority of any thread
Thread.NORM_PRIORITY	The normal priority of any thread

11. What are the methods available to set and get priorities?

set priority()	This is method is used to set the priority of thread
get priority()	This method is used to get the priority of thread.

12. Write a short note on thread scheduler.

In the implementation of threading scheduler usually applies one of the two following strategies:

preemptive scheduling – If the new has a higher priority then current running thread leaves the runnable state and higher priority thread enter to runnable state.

13. What is meant by lock in thread synchronization?

Lock refers to the access granted to a particular thread that can access the shared resources. At any given time, only one thread can hold the lock and their by have access to the shared resource. Every object in java has build-in lock that only comes in action when the object has synchronized method code.

14. What are two ways to synchronized the execution of code?

1. synchronized Methods
2. synchronized Blocks

15. What is the purpose of synchronized keyword in methods?

If any method is specified with keyword synchronized then this method of an object is only executed by one thread at a time.

16. What are synchronized blocks?

A synchronized statement is another way to create synchronized code. synchronized statements must specify the object that provides the intrinsic lock. The synchronized block allows execution of arbitrary code to be synchronized on the lock of an arbitrary object.

17. Write a short note on conditional thread safety.

The synchronized collections wrappers, synchronized map and synchronized list, are sometimes called conditional thread safe- all individual operations are thread-safe but sequences of operations where the control flow depends on the results of the previous operations may be subject to data races.

18. What are the three categories of notification strategies?
    1. Notify all waiting threads
    2. Notify 1 random of N waiting threads.
    3. Notify 1 specific of N waiting thread.

19. What is the difference between Daemon and non-daemon thread?

The daemon thread and non –daemon threads is that the JVM does not wait for Daemon thread before existing while it waits for user threads, it does not exit until unless all the user thread finish their execution.

20. What is meant by Generic programming?

Generic programming is a programming method that provides common code to many different types of objects. Generic programming includes the reusability of code as it can be used for different types of objects.

21. What are the advantages of using parameterized approach?
    • Whenever a value is retrieved, type casting is not necessary.
    •No error checking mechanism is needed. So class cast Exceptions are avoided.

Complier will report a syntax error and will refuse the compile program. If it detects any attempt to add an object of the wrong type. Compiler throws errors at compile time itself, not at run time.

22. What are type variables?

Type variables are identifiers used in generic programming to specify the type of the elements. These are generally declared in uppercase to keep them short. The following are the type variable names used by the java library.

Type of variable	For
E	the element type of a collection
K	key type of table
V	Value type of table
T	(U and S-neighboring letters) any type

23. What are generic class?

Generic class is a special type of class that provides common code for different types of objects by defining common type fields and methods. It contains one or more type variables defined between <> and separated by commas.

24. How are the type variables bound?

Type variables are restricted by extending the bounding type. That is by giving the bounding type to the type variables, restriction can be placed on the type variables. Even bounding type is the interface, extends keyword is used to inherit. Because it expresses that T should be a subtype of the bounding type.

25. What are the Restrictions and Limitations to be followed on generics?

- Type parameters cannot be installed with primitive types
- Runtime type inquiry only works with raw types
- We cannot throw or catch instances of a Generic class
- Arrays of parameterized types are not legal
- Type variables cannot be instantiated.
- Type variables are not valid in static contexts of generic classes

26. Why are wild cards needed?

For rigid type of systems, generic types are quite unpleasant to use. To overcome this problem, wildcards were introduced by java designers. Instead of supplying a specific type as the type argument for a generic type, ? can be specified as argument, in which case we have specified the type argument as a wildcard. A wild card type represents any class or interface type.

27. What is the need of Super type bounds to wildcards?

A wildcard with a super type bound gives the opposite behavior of the wildcards. wildcards with super type bounds let us write to a generic object, wildcards with subtype bounds let us read from generic objects.

28. What are Unbounded Wildcards?

Wildcards can be used without bounds also. These are known as unbounded wildcards. It is useful for very simple operations.

Example

Pair<?>

Pair<?> methods look like this.

? get first( )

void setfirst(?)

PART – B

1. Explain the different states of a thread.
2. Explain thread synchronization with examples.
3. Explain the algorithm used for thread scheduling
4. Describe multi threading.
5. Explain dead locks.
6. Explain about the thread group with program.
7. What is the role of priorities in multithreading. What are its limitations? How do you set and get priority values for threads in java?
8. Explain about inter-thread communication with example
9. Explain about Daemon thread with example
10. List down the restriction and limitations in generic programming