1. Define the following as it relates to threading:
Locks, Mutex, Semaphores, Synchronized, Volatile, Atomic
2. What is a deadlock condition?
3. What is a race condition?
4. What is a memory leak?
5. What is an ANR and what are some common causes?

1)
A lock is an abstract concept. A lock protects access to some kind of shared resource. If you own a lock then you can access the protected shared resource. If you do not own the lock then you cannot access the shared resource.

Mutex is short for MUTual EXclusion. Only the thread that acquired the lock can release the lock on a mutex. When the mutex is locked, any attempt to acquire the lock will be blocked.

Atomic operations in concurrent programming are program operations that run completely independently of any other processes.

Synchronized means that two threads cannot execute the method at the same time and the JVM takes care of enforcing that.

Volatile indicates that a value may change between different accesses, even if it does not appear to be modified.

A semaphore is a type of lock in which thread must wait until the semaphore's value is positive, then change the semaphore's value by subtracting one from it. When it is finished, the thread will changes the semaphore's value by adding one to it. It is crucial that these operations take place atomically—they cannot be subdivided into pieces between which other actions on the semaphore can take place.

2)
A deadlock is a situation where a set of processes are blocked because each process is holding a resource and waiting for another resource acquired by some other process.

3)
A race condition occurs when two or more threads can access shared data and they try to change it at the same time. Because the thread scheduling algorithm can swap between threads at any time, you don't know the order in which the threads will attempt to access the shared data.

4)
A Memory leak occurs when the program creates a memory in heap and forget to release it, even after there is no more way to access that memory.

5)

ANR means “Application not responding”.
While your activity is in the foreground, your app has not responded to an input event or `BroadcastReceiver` (such as key press or screen touch events) within 5 seconds.
While you do not have an activity in the foreground, your `BroadcastReceiver` hasn't finished executing within a considerable amount of time.