Question 1: (24 pts)
For each of the following statements, mark True ("T") or False ("F"): 

1. _______ Most databases support native search.
2. _______ Using a search architecture with a middleware layer such as Lucene/Solr has a disadvantage of keeping two copies of the same data.
3. _______ One of the full-text search challenges is stemming, which tokenizes a string into multiple words.
4. _______ \[d(a, c) >= d(a, b) + d(b, c)\] is always true, where \(d\) is the edit distance function, and \(a, b,\) and \(c\) are three strings.
5. _______ A user-defined function (UDF) provides a mechanism for extending the functionality of the database server by adding a function that can be implemented in another programming language such as C/C++.
6. _______ Android should not kill a running activity even in the case where the operating system runs out of resources (e.g., CPU, memory).
7. _______ A connection pool is a set of database connections that can be reused by different requests.
8. _______ JMeter can be used to simulate a heavy workload to a Web server to test its reliability and performance.

Question 2: (14 pts)
Build an inverted index based on the three documents below. Sort items in alphabetical order.

doc 1: The cat ran.
doc 2: David wore the hat.
doc 3: David caught the cat.

Question 3: (12 pts)
Suppose two MySQL instances are connected using the replication technique covered in our lectures. Mark T(true) or F (false) for each of the following statements.

1. _______ These two instances have different responsibilities.
2. _______ Applications can update any of the two instances and read the changes from the other.
3. _______ Applications can read from any of the two instances.
4. _______ An update to every instance can be made visible to the other instance.
Question 4: (16 pts)
Briefly explain each of the following Android activity states.

ACTIVE

PAUSED

STOPPED

FINISH

Question 5: (10 pts)
Finish the following diagram for the Fabflix project 5 by adding links between the modules and the corresponding Read/Write operations.

```
  Apache Load Balancer
  (port 80)
    Instance 1
     |        |
     |        |
  Tomcat (port 8080)
    Instance 2
     |        |
     |        |
MySQL Master (port 3306)
  Tomcat (port 8080)
     Instance 3
     |        |
     |        |
MySQL Slave (port 3306)
```

Question 6: (12 pts)
Briefly explain the meaning of “Sticky session” in the load balancer used in project 5.

Question 7: (12 pts)
Ajax stands for “Asynchronous JavaScript And XML.” Briefly explain the meaning of each of the words:

- Asynchronous
- JavaScript
- XML
Question 1:
T T F F T F T T

Question 2:
cat: 1,3
caught: 3
david: 2,3
hat: 2
ran: 1
the: 1,2,3
wore: 2

Question 3:
T F T F

Question 4:
STOPPED: The activity is completely hid by another activity and it is no longer visible to the user.
ACTIVE: The activity is in the foreground of the screen.
PAUSED: The activity has lost focus but is still visible and alive.
FINISH: The system drops the activity from memory by killing its process.

Question 5:

![Diagram of a web application architecture]

Question 6:
It is a persist session over several requests of the same client

Question 7:
Asynchronous: callback functions when the event occur
Javascript: programming language
XML: DOM-based structure object