

CS145 Midterm "Cheat Sheet"

October 25, 2015

1 Possibly Useful Information

- **Canonical SQL Statement:**

```
SELECT <attributes>
FROM <tables>
WHERE <conditions>
GROUP BY <attributes>
HAVING <conditions>
```

- **Functional Dependency (FD):** For a relation R , and sets of attributes X and Y , the functional dependency $X \rightarrow Y$ holds if for any $t_1, t_2 \in R$, $t_1[X] = t_2[X] \implies t_1[Y] = t_2[Y]$.
- **Armstrong's Axioms:** Let the A_i s, B_j s, and C_k s be attributes:
 1. *Split/Combine:* If $A_1, \dots, A_n \rightarrow B_j$ for $j = 1, \dots, m$, then this is equivalent to $A_1, \dots, A_n \rightarrow B_1, \dots, B_m$ and vice-versa
 2. *Reduction/Trivial:* $A_1, \dots, A_n \rightarrow A_i$ for any $i = 1, \dots, n$
 3. *Transitive Closure:* If $A_1, \dots, A_n \rightarrow B_1, \dots, B_m$ and $B_1, \dots, B_m \rightarrow C_1, \dots, C_p$ then $A_1, \dots, A_n \rightarrow C_1, \dots, C_p$
- **Closure:** Given a set of attributes X and a set of FDs F , the closure X^+ is the set of all attributes y such that $X \rightarrow y$.
- **Superkey:** Given a relation R , a superkey is a set of attributes X such that X^+ is equal to the full set of attributes of R .
- **Key:** A key is a minimal superkey, i.e. a superkey where no subset of it is also a superkey.
- **Boyce-Codd Normal Form (BCNF):** A relation R is in BCNF if for all sets of attributes X , either $X^+ = X$ (X is trivial) or $X^+ =$ the set of all attributes (X is a superkey).
- **Conflicts:** Two actions conflict if they are part of different TXNs, involve the same variable, and at least one of them is a write.
- **Serializable:** A schedule is serializable if it is equivalent to some serial ordering.
- **Multi-Value Dependency (MVD):** Given a relation R with a set of attributes A , two sets of attributes $X, Y \subseteq A$, we say that the MVD $X \twoheadrightarrow Y$ holds if for any tuples $t_1, t_2 \in R$ such that $t_1[X] = t_2[X]$, there is a tuple t_3 such that:
 - $t_3[X] = t_1[X]$
 - $t_3[Y] = t_1[Y]$
 - $t_3[A \setminus Y] = t_2[A \setminus Y]$