

PART 3 RA

PART 4 NORMALIZATION

1.) Candidate keys: a.) id

b.) name, major

c.) name, gpa

d.) name, school

2.) Yes the relation is 3NF because looking at the functional dependencies we can see that id is a super key and then the prime attributes of this relationship are id, name, major, school, and gpa. Looking at the relationships, in form $X \rightarrow Y$ in all of them X is either a candidate key or Y is a prime attribute meaning the relation is 3NF.

3.) No the relation is not BCNF because to be BCNF all functional dependencies of the form $X \rightarrow Y$ must have X as a candidate key. Looking at the functional dependencies both GPA and School are not candidate keys hence the relation is not BCNF

4.) $GPA \rightarrow Major$ is violated in the table as Alice and David both have GPA's of 3.8 but have different majors. $School \rightarrow Major$ is also violated multiple times as many people are in the same school with different majors.