Answer the following questions:

In the traditional (spreadsheet) table below:

a) Explain briefly with an example how an update anomaly might occur.

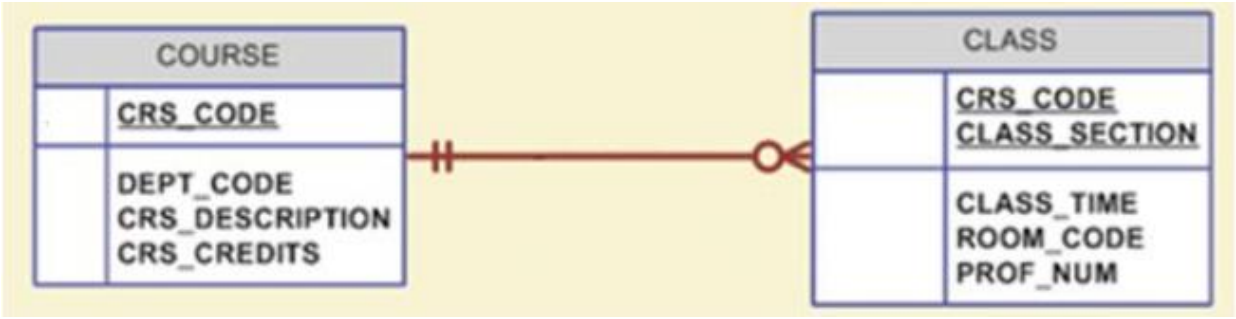
b) How can you avoid the anomaly?

Student number	Student name	Course ID	Course name	Grade	Teacher ID	Teacher name	Teacher phone
s1198121	Nosheen	2814ict	Data management	7	s2982029	Mohammad	373 55032
s2729923	Sachin	2814ict	Data management	6	s2982029	Mohammad	373 55032
s9828313	John	2814ict	Data management	7	s2982029	Mohammad	373 55032
s8837383	Nosheen	7003ict	Database design	7	s7479400	John	555 78544
s8792892	Emon	7003ict	Database design	6	s7479400	John	555 78544
s7892829	Fahimeh	7003ict	Database design	5	s7479400	John	555 78544
s9828980	Robert	2814ict	Data management	7	s2982029	Mohammad	373 55032
s7729922	Daniel	7003ict	Database design	6	s7479400	John	555 78544
s9229923	Maria	7003ict	Database design	5	s7479400	John	555 78544

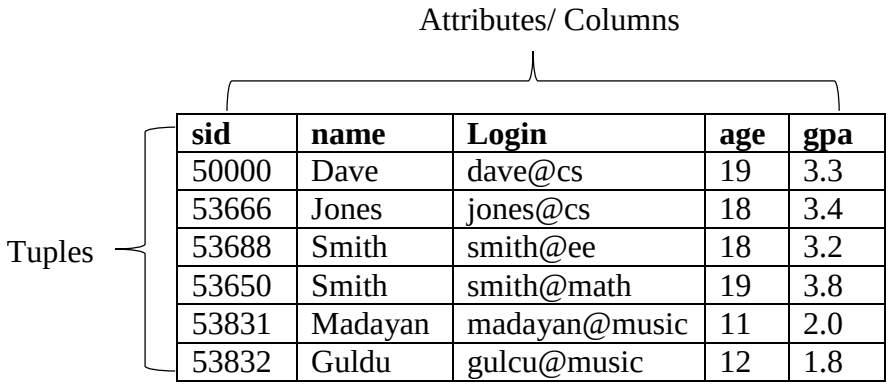
In the entity relationship diagram (ERD) below, for each entity write:

a) Its primary key.

b) All the foreign keys.



What is the difference between a candidate key and the primary key for a given relation? What is a superkey?



sid	name	Login	age	gpa
50000	Dave	dave@cs	19	3.3
53666	Jones	jones@cs	18	3.4
53688	Smith	smith@ee	18	3.2
53650	Smith	smith@math	19	3.8
53831	Madayan	madayan@music	11	2.0
53832	Guldu	gulcu@music	12	1.8

Give an example of an attribute (or set of attributes) that you can deduce is not a candidate key, based on this instance being legal.

Is there any example of an attribute (or set of attributes) that you can deduce is a candidate key, based on this instance being legal?

What is a foreign key constraint? Why are such constraints important? What is referential integrity?

Answer each of the following questions briefly. The questions are based on the following relational schema:

Emp(eid: integer, ename: string, age: integer, salary: real)

Works(eid: integer, did: integer, pcttime: integer)

Dept(did: integer, dname: string, budget: real, managerid: integer)

Give an example of a foreign key constraint that involves the Dept relation. What are the options for enforcing this constraint when a user attempts to delete a Dept tuple?