The design A has 3 identifying relationships for the Enrollment entity. It means an enrollment record cannot exist unless there is a matching record in Term, Student and Course. Enrollment has a composite primary key, consisting of StudentID, CourseID and TermID.

In the design B, we use a surrogate key for the Enrollment entity and turn the identifying relationships into non-identifying relationships. What constraints do we need to implement in design B to ensure the data integrity maintained in design A is still enforced in design B? Please explain in details.

We can implement Entity Integrity Constraint to maintain data integrity. Surrogate key is not a natural key but a system generated identifier which does not have direct relation with the business requirement and roles. There are primarily two types of integrity constraints that help us in ensuring the uniqueness of each row, i.e, UNIQUE constraint and PRIMARY KEY constraint.

Unique Key : Unique key, uniquely identify record in the table, but it accept the null value and can be apply on more the one column.

PRIMARY KEY constraint: It is also an unique key which identify unique record in table. It has similar feature as unique key, but it does not accept null value and there will be only one primary key in the table.