Solution – Assignment#2
Database Systems
BESE15-A

Entity Relations Model

The given Entity relationship diagram can be converted into relational model as follows.

PROFESSOR (PSSN , Age , Specialization , Rank , DNO)
DEPT (DNO , Office , DName)
WORKDEPT(PSSN , DNO , Perc_Time)
PROJECT (PID , Budget , Sdate , Edate , Sponsor , PSSN)
WORKIN (PID , PSSN)
GRADSTD (SSN **,** Age , Name , Deg_prog , DNO , PSSN , PID)

Normalization

1 NF

1. Under the assumption that attribute 'Specialization' of relation 'Professor' can be multi-valued, the following decomposition can be made.

PROFESSOR (PSSN , Age , Spec , Rank , DNO)

PROFESSOR (PSSN , Age , Rank , DNO)
SPECIALIZATION (**PSSN , Specialization**)

2. Similalry, the 'Sponsor' attribute in 'Project' can be multi-valued and the relation can be decomposed into two relations.

PROJECT (PID , Budget , Sdate , Edate , Sponsor , PSSN)

PROJECT (PID , Budget , Sdate , Edate , PSSN)
SPONSOR (**PID , Sponsor**)

2 NF

There are not partial dependencies in the given database so all the relations are already in 2NF.

3 NF

Assuming the following functional dependency holds:
Sdate ---> Edate

Due to the transitive dependency, the relation 'Project' is not in 3NF.

PROJECT (PID , Budget , Sdate , Edate , Sponsor , PSSN)

It can be decomposed into two relations both being in 3NF.

PROJECT (PID , Budget , Sdate , Sponsor , PSSN)
EDATE (Sdate , Edate)

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