DBS Hw 1

Question 1

Question a

    T1 = project_{classcode, instructorname, email} (select_{instructorname = 'Fogg'} (Teaches))
    T2 = select_{examdate > '11-01-2020'} (Exams)
    Result = project_{classname, examname, examdate} (T1 * T2 * Classes)

Question b

    Result = project_{classcode, dayofweek, starttime} (Classmeetings)) * (project_{classcode, dayofweek, starttime} (Officehours)

Question c

    Result = project_{classcode, classname} ((select_{dayofweek='Monday'} (Classmeetings)) * Classes)

Question d

    T1 = project_{classcode} (select_{semester = 'Fall', year = '2000'} (Classes))
    T2 = project_{sitename} ((select_{resourcetype = 'hw'} (Resources)) * T1)
    Result = project_{username, bestbrowser} (Sites * T2)

Question e

    Result = (project_{sitename} (Classmeetings)) union (project_{sitename} (Exams)) union (project_{sitename} (Officehours)) union (project_{sitename} (Resources))

Question f

    T1 = project_{classcode, sitename} Classmeetings
    T2 = project_{classcode, sitename} Exams
    T3 = project_{classcode, sitename} Officehours
    T4 = project_{classcode, sitename} Resources
    T5 = T1 union T2 union T3 union T4 union T5
    T6(classcode6, sitename6) = T5
    T7 = project_{classcode6, classcode} (T6 x T5)
    T8 = project_{classcode6, classcode} (select_{classcode6 <> classcode and sitename = sitename6 } (T6 x T5))
    Result = T7 - T8

Question g

    T1 = project_{classcode, classname, instructorname} (Classes * Teaches)
    T2(classcode2, classname2, instructorname2) = T1
    T3(classcode3) = project_{classcode} (select_{classcode = classcode2 and instructorname <>

> instructorname2} (T1 x T2))
> Result = project_{classcode, classname} (select_{classcode <> classcode3} (Classes x T3))

Question h

> T1 = (select_{dayofweek <> 'Monday' and dayofweek <> 'Wednesday'} (Officehours))
> T2 = project_{classcode} (select_{semester = 'Fall', year = '2000'} (Clesses))
> T3 = project_{classcode, starttime, duration} (T1 * T2)
> ResultCourseCode = project_{classcode} T3
> ResultOfficeHour = T3

Question 2

Question 1

Keys

> ABC

BCNF

Not satisfied, because

- AC -> DE is not trival and AC is not a superkey
- BD -> F is not trival and BD is not a superkey

3NF

Not satisfied, because

- AC -> DE is not trival, AC is not a superkey, and DE are not prime attributes
- BD -> F is not trival, BD is not a superkey, and F is not prime attribute

Question 2

keys

> ABC, BCD

BCNF

Satisfied, because

- ABC -> DEF is not trival and ABC is a superkey
- AB -> A is trival
- BCD -> AEF is not trival and BCD is a superkey

3NF

Satisfied, because BCNF is satisfied

Question 3

keys

> BC

BCNF

Satisfied, because

- ABC -> DE is not trival and ABC is a superkey
- BC -> AF is not trival and BC is a superkey

3NF

Satisfied, because BCNF is satisfied

Question 4

keys

ABC, BDC

BCNF

Satisfied, because

- ABC -> DEF is not trival and ABC is a superkey
- BD -> A is not trival and BD is a superkey

3NF

Satisfied, because BCNF is satisfied