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Assignment 3

Questions:
1.
A.
* Arity: 1
* Cardinality: 6

B.
* Arity: 1
* Cardinality: 11

C.
* Arity: 4
* Cardinality:
  * Min: 11
  * Max: 17

D.
* Arity: 5
* Cardinality:
  * Min: 0
  * Max: 6

E.
* Arity: 4
* Cardinality:
  * Min: 0
  * Max: 6

2.
a.
Π names (σ Acid_Level > 0.75 (Forest))

b.
Π names (State.Abbreviation = ‘PA’ ⋈ (σ State = ‘PA’ ^ Percentage >= 0.5 (Coverage))

3.
a.
FN <- σ Name = ‘Allegheny National Forest’ (Forest)
RN <- Π Road_No (Intersection ⋈ FN)
RESLT <- Π Name (Road ⋈ RN)

b.
RT <- σ Report_Time >= Jan. 9, 2019 ^ Report_Time <= Jan. 11, 2019 (Report)

FL <- Π MBR_XMIN, MBR_XMAX, MBR_YMIN,MBR_YMAX(σ Name = ‘Allegheny National Forest’ (Forest))

SL <- Π X, Y (RT ⋈ Sensor)

RESLT <- SL ⋈ (SL.X >= FL.MBR_XMIN ^ SL.X <= FL.MBR_XMAX ^ SL.Y >= FL.MBR_YMIN ^ SL.Y <= FL.MBR_YMAX)

4.
a.
RT <- σ Report_Time >= Jan. 9, 2019 ^ Report_Time <= Jan. 11, 2019 (Report)
SID <- Sensor - RT

FL <- Π MBR_XMIN, MBR_XMAX, MBR_YMIN,MBR_YMAX(σ Name = ‘Allegheny National Forest’ (Forest))

RESLT <- Π Name(SID ⋈ (SID.X >= FL.MBR_XMIN ^ SID.X <= FL.MBR_XMAX ^ SID.Y >= FL.MBR_YMIN ^ SID.Y <= FL.MBR_YMAX))

b.

FS <- Sensor ⋈ (Sensor.X >= Forest.MBR_XMIN ^ Sensor.X <= Forest.MBR_XMAX ^ Sensor.Y >= Forest.MBR_YMIN ^ Sensor.Y <= Forest.MBR_YMAX)

FSR <- FS * Report

RESLT <- Forest_No, fAVG(Temperature), COUNT(FSR)

c.

MAXT <- Sensor_Id, f MAX Temperature (Report)
SID <- MAXT ⋈ Sensor
RESLT <- Π X,Y (SID)

d.

SA(State,Area) <- State f SUM Area(Coverage)
MAXA(Area) <- fMAX Area(SA)
RESLT <- Π State(SA * MAXA)

e.

STATES <- Π Forest_No, State(Coverage)
RESLT (S1,S2) <- Π Coverage.State, STATES(Coverage ⋈ (STATES.Forest_No = Coverage.Forest_No))

5.

a.

Name	Age	ZIP
Alice	22	15210
Bob	23	15210
Mike	22	15213
Steve	29	15222
Green	24	15220
Frank	23	15213
Reo	27	15213

b.

Name	GPA	ZIP
Alice	3.2	15210
Bob	4	15210
Mike	2.5	15213
Steve	3.5	15222
Kyrie	2.6	14352
Jerry	3.7	19731

c.

Name	GPA	ZIP	Age
Alice	3.2	15210	22
Bob	4	15210	23
Mike	2.5	15213	22
Steve	3.5	15222	29
Kyrie	2.6	14352	
Jerry	3.7	19731	