**NOTE:** One or more NGO’s can work on a single project and Ome or More donors can fund a single project VIA one or more NGO’s.

**Q1)** Identify all NGOs actively working in the Health, Education, and Gender group, together with the number of projects and total amount of funds received by each NGO.

**SQL Code with sample output:**

**SELECT**

n.ngo\_name as ngo\_name,count(distinct p.id) as no\_of\_projects,format(sum(f.amount+f.monetary\_value), 2) as funds\_received

**FROM**

ngo n,

funds f,

project p,

project\_activity pa,

activities a,

class c

**WHERE**

n.id = f.ngo\_id

and f.pro\_id = p.id

and p.id = pa.pro\_id

and pa.act\_id = a.id

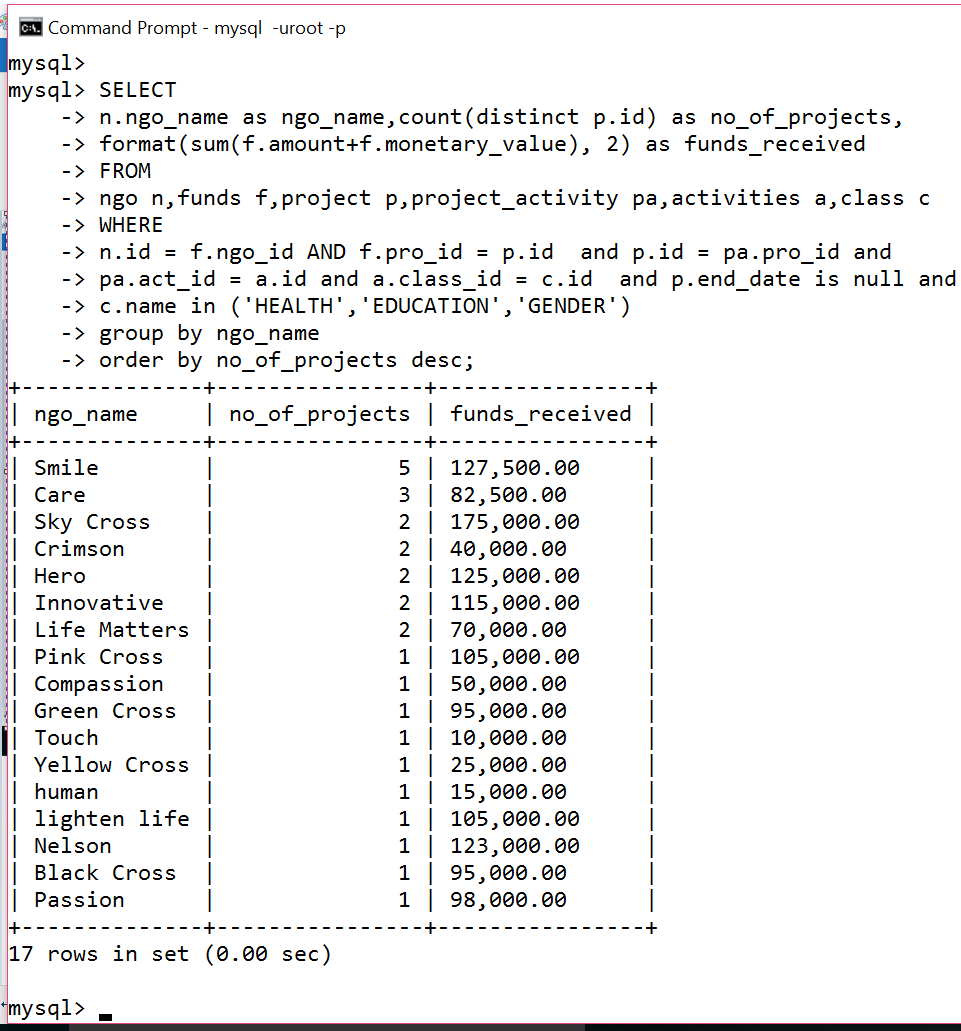
and a.class\_id = c.id

and p.end\_date is null

and c.name in **('HEALTH','EDUCATION','GENDER')**

**group by ngo\_name**

order by no\_of\_projects desc;

****

**RA Expression:**

**Π**ngo\_name, numberOFprojects, FUNDSreceived

{

**γ**ngo\_name, count(distinct R4.pro\_id) → numberOFprojects, SUM(F.amount+F.monetary\_value) → FUNDSreceived

{

**σ**NGO.id=F.ngo\_id

[

NGO **⨝** [

**σ**F.pro\_id=R3.pro\_id(F**⨝**(**σ**R1.act\_id=R2.id(**ρ**(R3,

(**σ**P.id=PA.pro\_id AND P.end\_date<>NULL(**ρ**(R1,(P**⨝**PA))))**⨝**

(**σ**A.class\_id=C.id AND C.name='Health' OR 'Education' OR

'Gender'(**ρ**(R2,(A**⨝**C))))))))

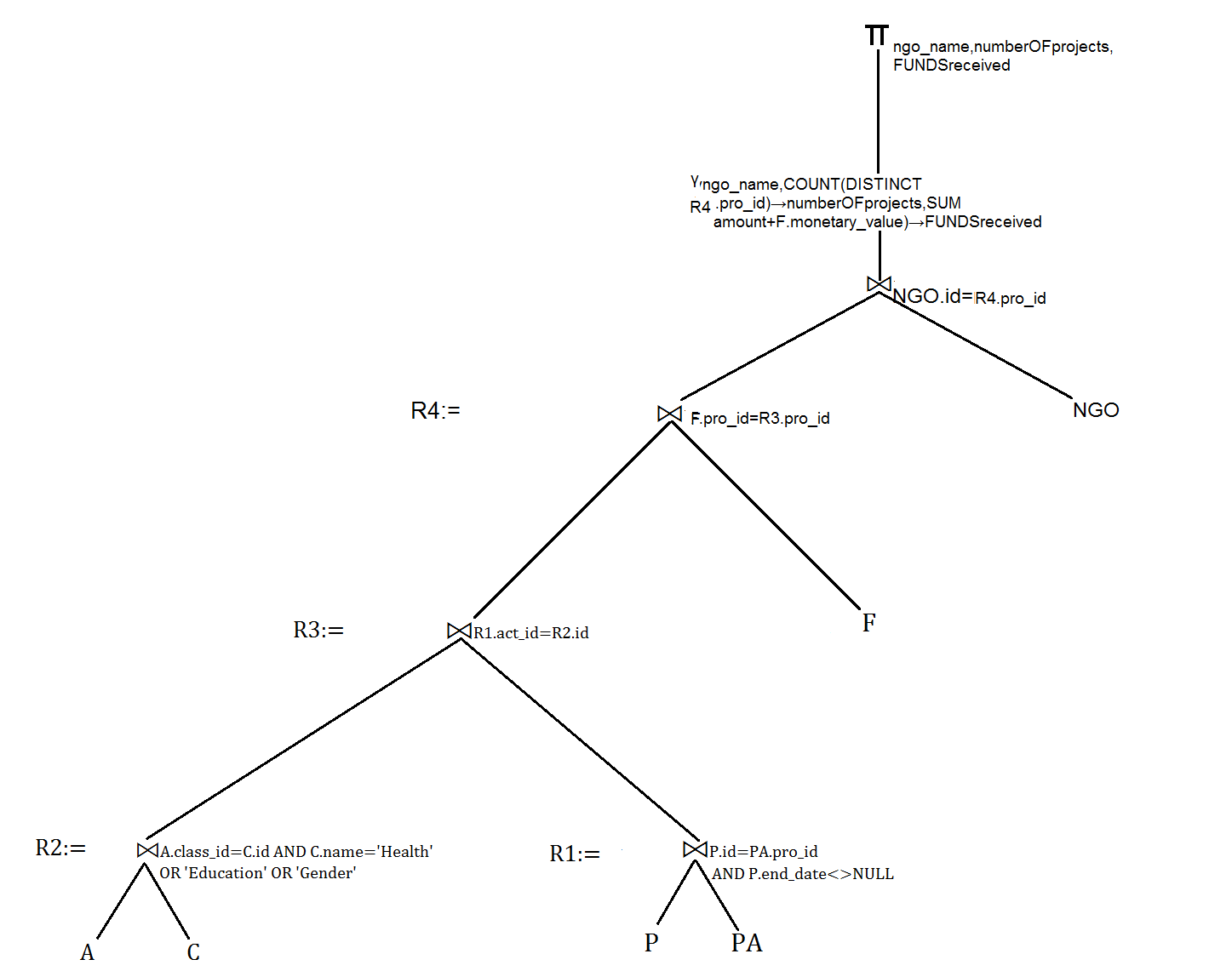
]

]

}

}

**RA Expression Trees:**

****

**Q2)** Repeat the query in [1] for the Youth Development, Child Protection, and Nutrition group.

**SQL Code with sample output:**

**SELECT**

n.ngo\_name as ngo\_name,count(distinct p.id) as no\_of\_projects,format(sum(f.amount+f.monetary\_value), 2) as funds\_received

**FROM**

ngo n,

funds f,

project p,

project\_activity pa,

activities a,

class c

**WHERE**

n.id = f.ngo\_id

and f.pro\_id = p.id

and p.id = pa.pro\_id

and pa.act\_id = a.id

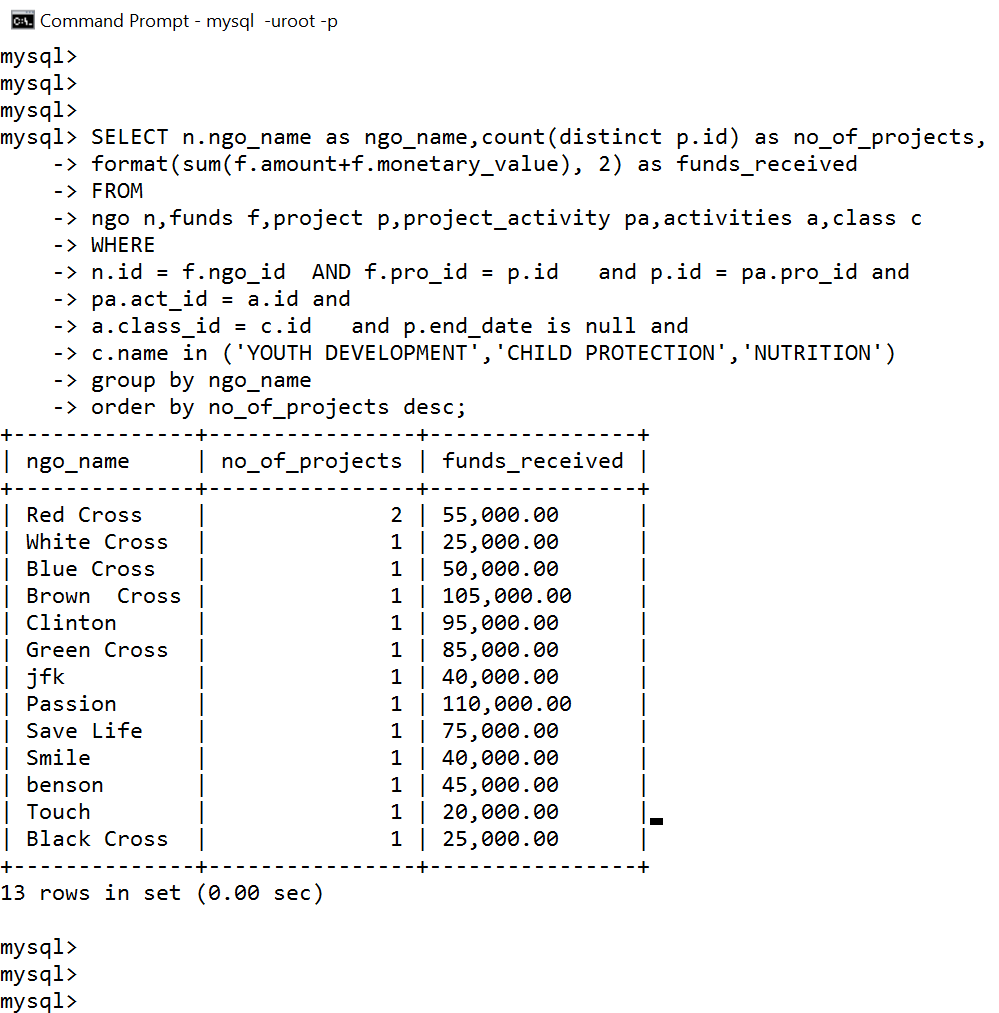
and a.class\_id = c.id

and p.end\_date is null

and c.name in **('YOUTH DEVELOPMENT','CHILD PROTECTION','NUTRITION')**

**group by** ngo\_name

order by no\_of\_projects desc;



**RA Expression:**

Πngo\_name, numberOFprojects, fundsReceived

{

γngo\_name, count(distinct R4.pro\_id) → numberOFprojects, SUM(F.amount+F.monetary\_value) → fundsReceived

{

σNGO.id=F.ngo\_id

[

NGO ⨝ [

σF.pro\_id=R3.pro\_id(F⨝(σR1.act\_id=R2.id(ρ(R3,

(σP.id=PA.pro\_id AND P.end\_date<>NULL(ρ(R1,(P⨝PA))))⨝

(σA.class\_id=C.id AND C.name='Youth Development'

OR 'Child Protection' OR ' Nutrition'(ρ(R2,(A⨝C))))))))

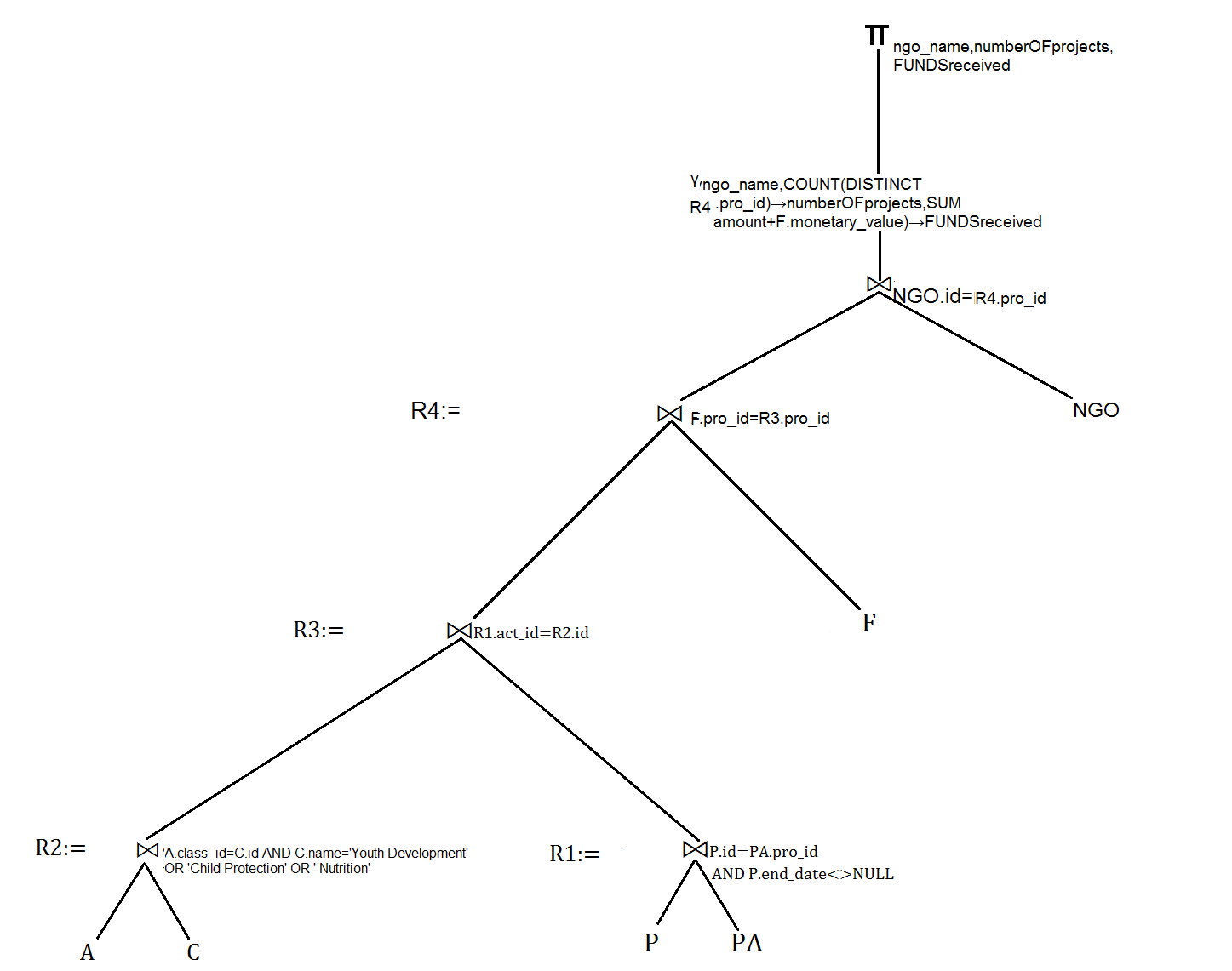
]

]

}

}

**RA Expression Trees:**



**Q3)** Identify the donors together with the total number of projects funded and amount

of funds targeting the groups of activities in [1] and [2].

**SQL Code with sample output:**

**SELECT**

d.donor\_name as donor\_name,COUNT(distinct f.pro\_id) as no\_of\_projects\_funded,format(sum(f.amount+f.monetary\_value), 2) as amount\_of\_funds

**FROM**

donor d,

funds f,

project p,

project\_activity pa,

activities a,

class c

**WHERE**

d.id = f.donor\_id

and f.pro\_id = p.id

and p.id = pa.pro\_id

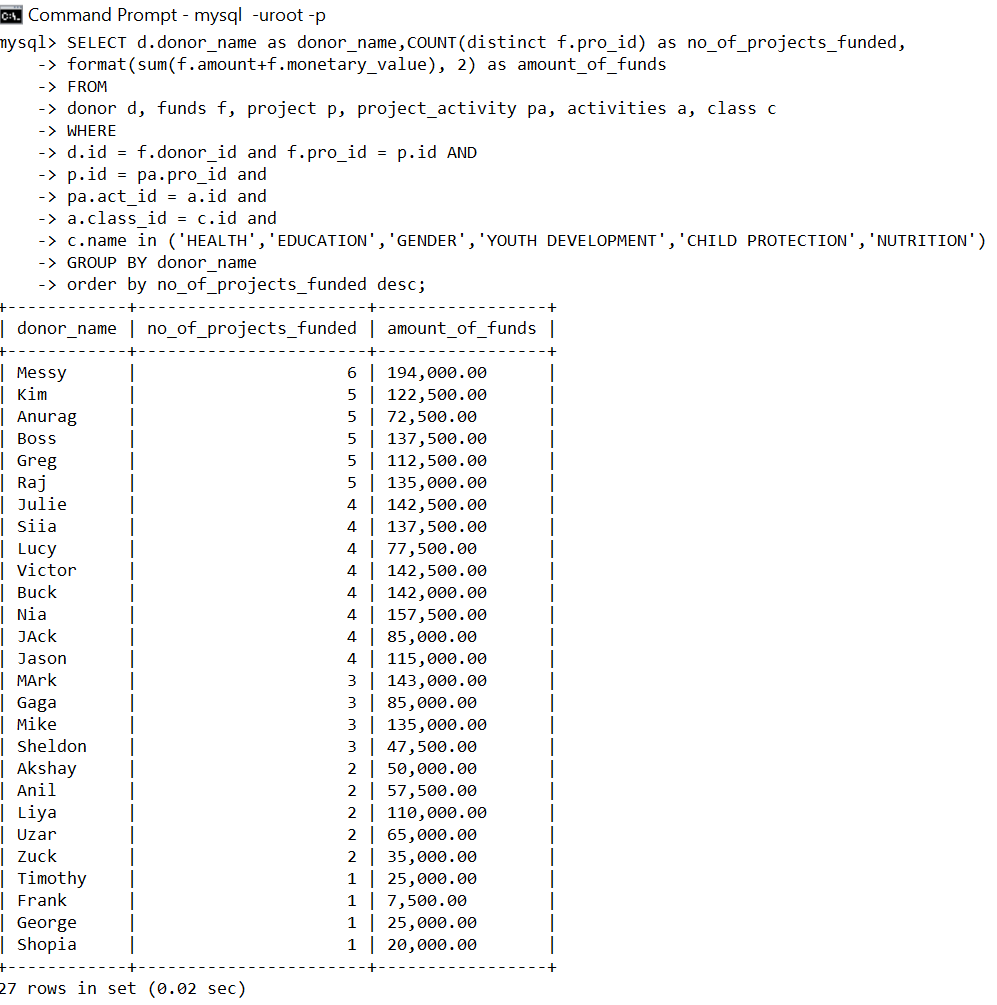
and pa.act\_id = a.id

and a.class\_id = c.id

and c.name in **('HEALTH','EDUCATION','GENDER','YOUTH DEVELOPMENT','CHILD PROTECTION','NUTRITION')**

**GROUP BY** donor\_name

order by no\_of\_projects\_funded desc;



**RA Expression:**

**π**dname,numberOFprojects,FUNDSreceived

{

**γ**D.donor\_name → dname,count(distinct R4.pro\_id) → numberOFprojects, SUM(F.amount+F.monetary\_value) → FUNDSreceived

{

**σ**D.id=R4.donor\_id

[D **⨝**

[**σ**F.pro\_id=R3.pro\_id

(**ρ**(R4,F **⨝** (**σ**R1.act\_id=R2.id((**σ**P.id=PA.pro\_id AND P.end\_date<>NULL(**ρ**(R1,(P **⨝** PA)))) **⨝** (**σ**A.class\_id=C.id AND C.name='Health' OR 'Education' OR 'Gender' OR 'Youth Development' OR 'Child Protection' OR 'Nutrition'(**ρ**(R2,(A **⨝** C)))))))

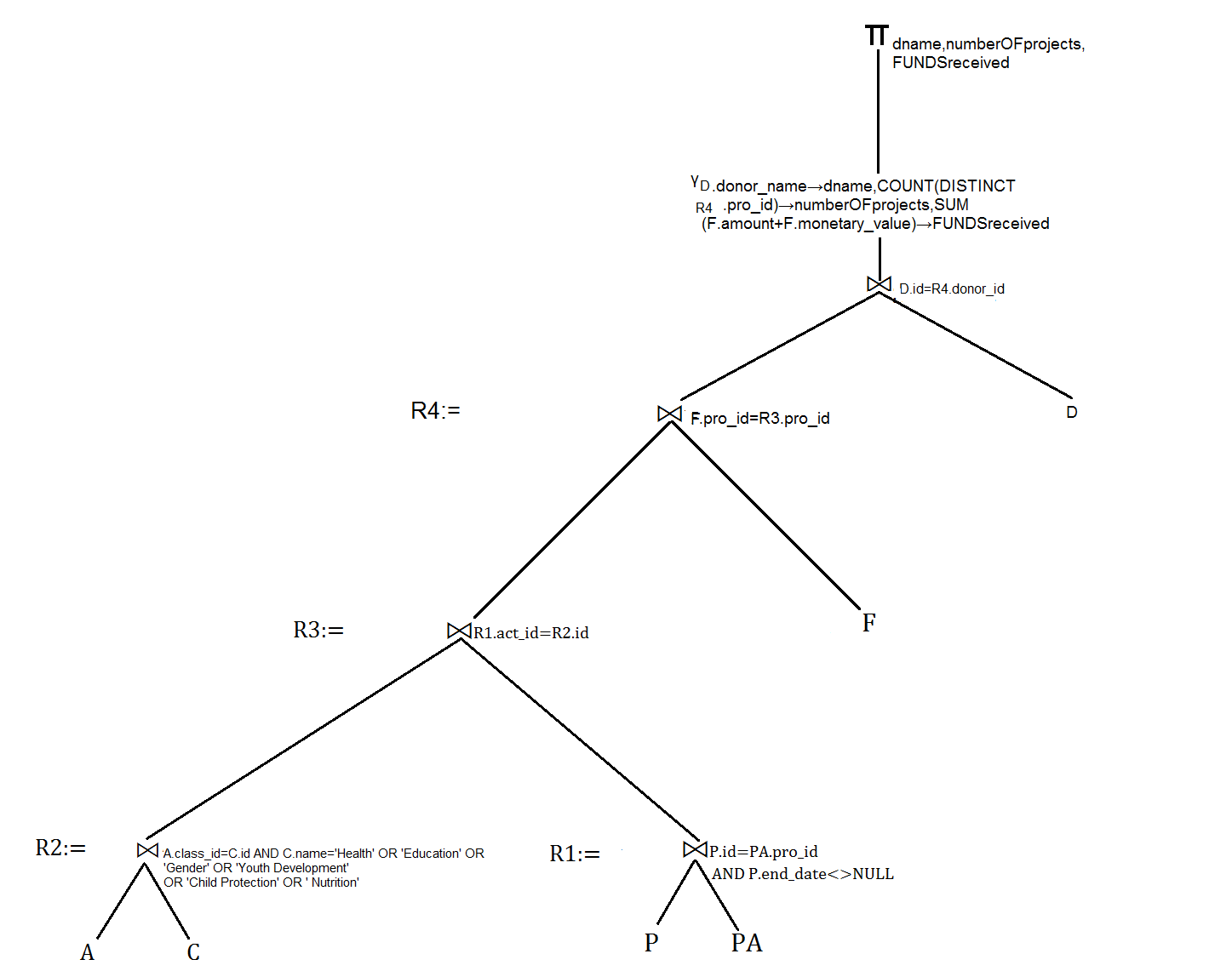
]

]

}

}

**RA Expression Trees:**

****

**Q4)** Repeat the queries in [1] and [2] to identify NGOs actively working in rural areas and slums together with the number of projects and total amount of funds received by each NGO.

**SQL Code with sample output:**

**SELECT**

n.ngo\_name as ngo\_name,count(distinct p.id) as no\_of\_projects,format(sum(f.amount+f.monetary\_value), 2) as funds\_received

**FROM**

ngo n,

funds f,

project p,

project\_activity pa,

activities a,

class c

**WHERE**

n.id = f.ngo\_id

and f.pro\_id = p.id

and p.id = pa.pro\_id

and pa.act\_id = a.id

and a.class\_id = c.id

and p.end\_date is null

and c.name in ('HEALTH','EDUCATION','GENDER','YOUTH DEVELOPMENT','CHILD PROTECTION','NUTRITION')

and p.id in

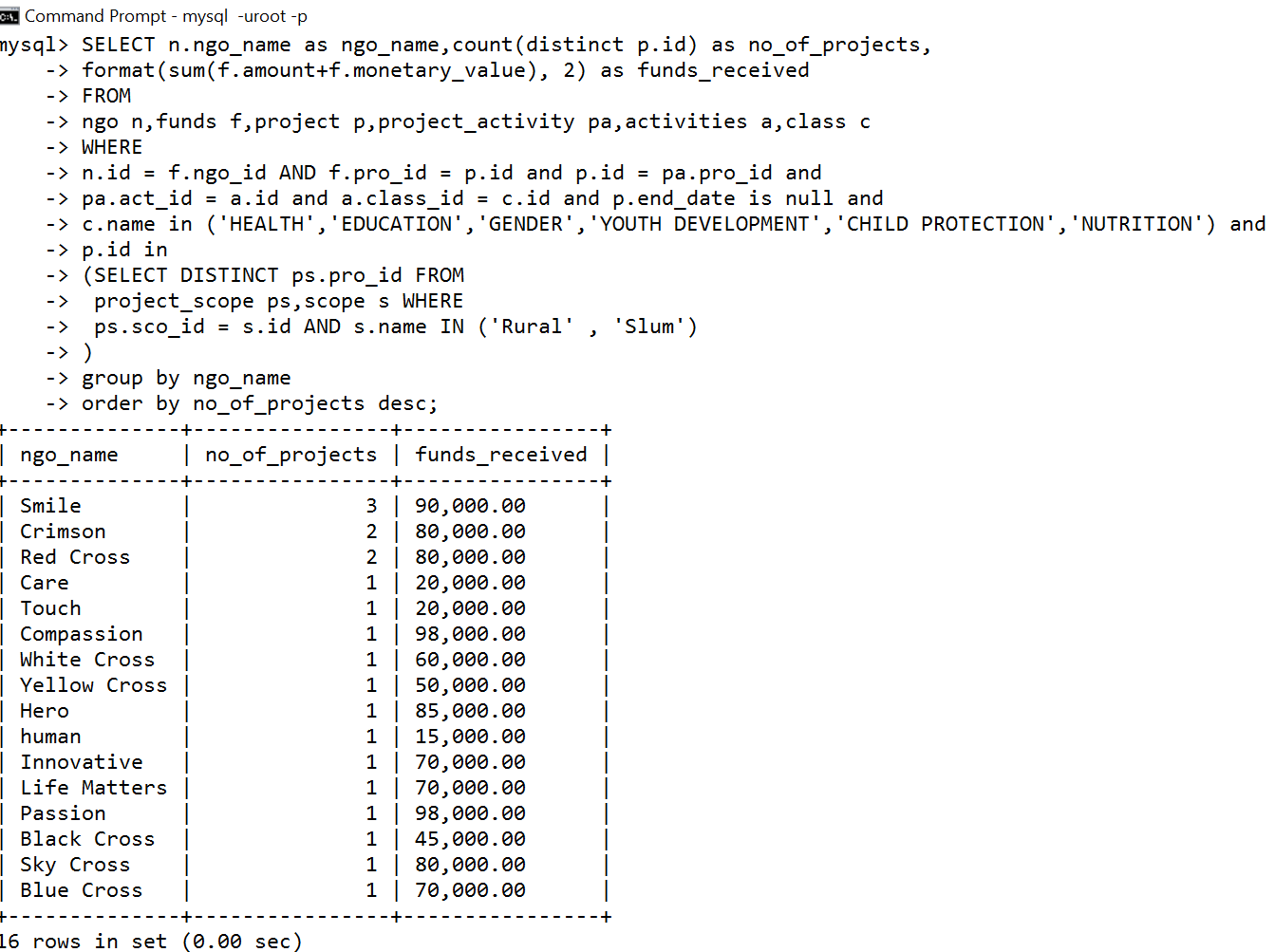
(

SELECT DISTINCT ps.pro\_id FROM project\_scope ps,scope s WHERE ps.sco\_id = s.id AND s.name IN (**'Rural' , 'Slum'**)

)

**group by** ngo\_name

order by no\_of\_projects desc;



**RA Expression:**

**π**ngo\_name,numberOFprojectsFUNDSreceived

{

**γ**ngo\_name,count(distinct R5.pro\_id) → numberOFprojects,SUM(F.amount+F.monetary\_value) → FUNDSreceived

[

**σ**NGO.id=F.ngo\_id

[

NGO **⨝**

[

**σ**F.pro\_id=R4.pro\_id

[

(**ρ**(R5,F **⨝** (**σ**P.id=PA.act\_id(**σ**P.id=PS.pro\_id AND P.end\_date<>NULL(**ρ**(R3,P **⨝** (**σ**DISTINCT PS.pro\_id(**σ**PS.sco\_id=S.id AND S.name='RURAL' OR 'SLUM'(PS **⨝** S))))) **⨝** (**σ**PA.act\_id=R2.act\_id(**ρ**(R4,PA **⨝** (**σ**A.class\_id=C.id AND C.name='Health' OR 'Education' OR 'Gender' OR 'Youth Development' OR 'Child Protection' OR 'Nutrition'(**ρ**(R2,(A **⨝** C)))))))))

]

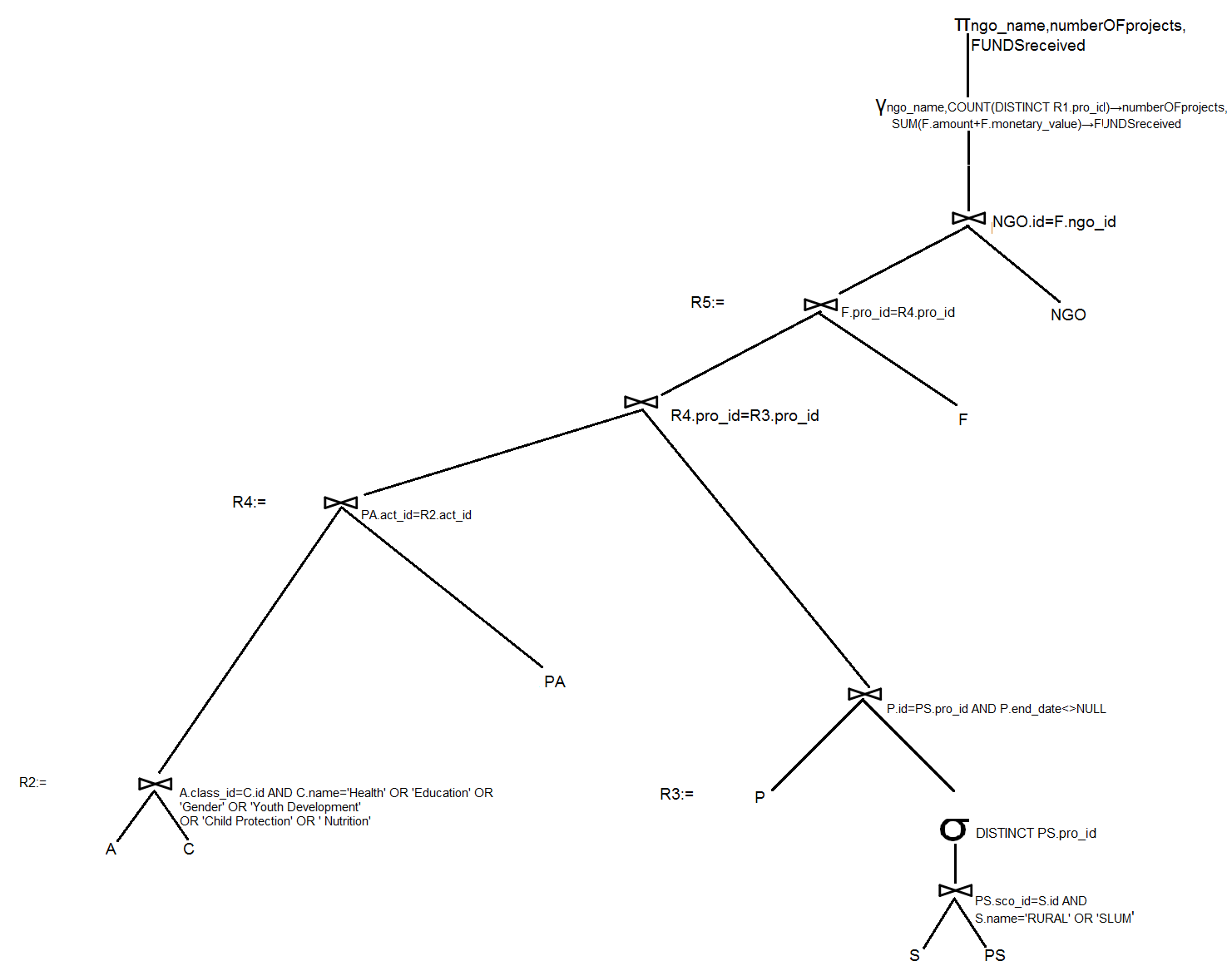
]

]

]

}

**RA Expression Trees:**

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**Q5)** Identify the donors together with the total number of projects funded and amount

of funds targeting rural areas and slums.

**SQL Code with sample output:**

**SELECT**

d.donor\_name as donar\_name,count(distinct p.id) as projects\_funded,format(sum(f.amount+f.monetary\_value), 2) as total\_funds\_amount

**FROM**

donor d,

funds f,

project p

**WHERE**

d.id = f.donor\_id

and f.pro\_id = p.id

and p.id in

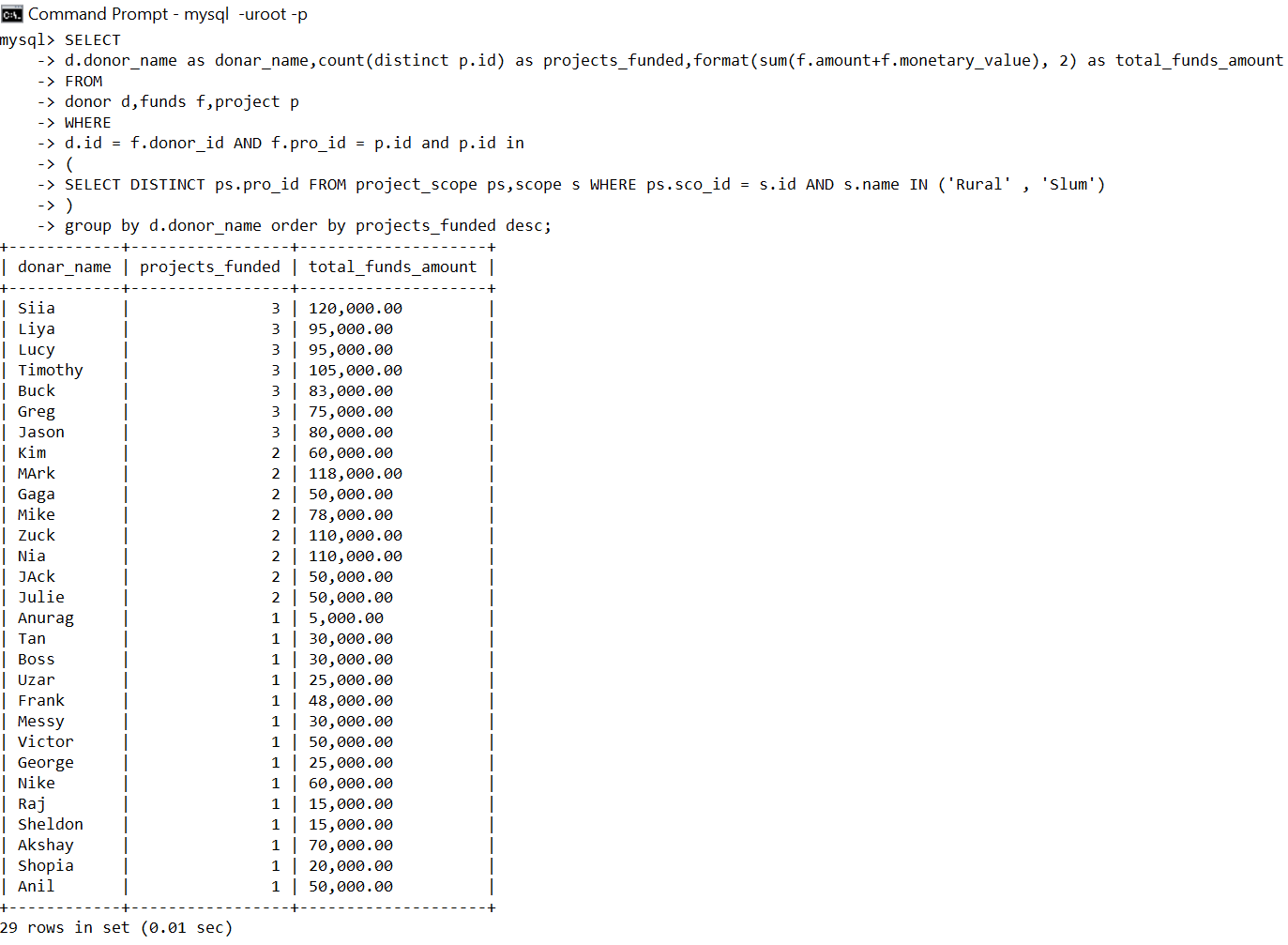
(

SELECT DISTINCT ps.pro\_id FROM project\_scope ps,scope s WHERE ps.sco\_id = s.id AND s.name IN (**'Rural' , 'Slum'**)

)

**group by** d.donor\_name

order by projects\_funded desc;



**RA Expression:**

**Π**donor\_name, numberOFprojects, fundsReceived

{

**γ**donor\_name, count(distinct R1.pro\_id) → numberOFprojects, SUM(F.amount+F.monetary\_value) → fundsReceived

[**σ**D.id=F.donor\_id

[D **⨝**

(**σ**F.pro\_id=.pro\_id(F **⨝**

(**σ**P.id=PS.pro\_id(**ρ**(R1,P **⨝** (**σ**PS.sco\_id=S.id AND S.name='RURAL' OR

'SLUM'(PS **⨝** S)))))

)

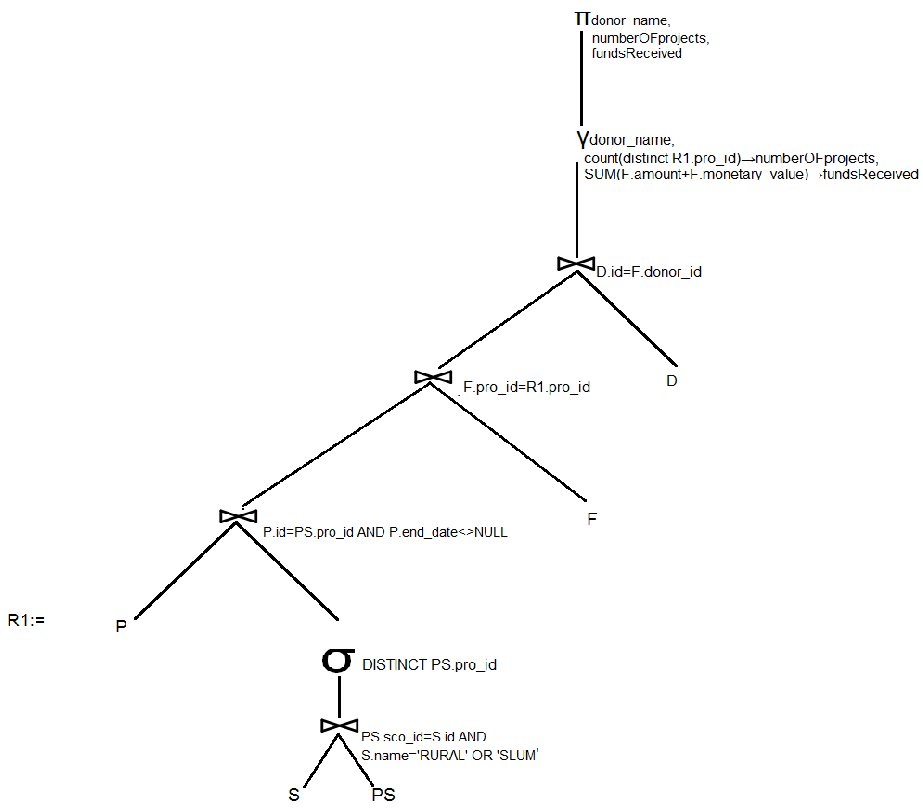
)

]

]

}

**RA Expression Trees:**

****