Institutes Report

First Query : information of current and previous researchers (all together)

ρ_p (Persons) ρ_c (contracts) ρ_{ra} (research_activities)

researcher_info $\longleftarrow \sigma_{institute\_id='test\_id'}$ (p $\bowtie_{p.id=c.person\_id}$ c) $\bowtie_{c.research\_acticvity\_id=ra.id}$ ra)

$\pi_{person\_id,ssn,first\_name,last\_name,birth\_date,email,phone\_number}$ (researcher_info)

Second Query : Financial records of an institute (financial supports for research activities)

ρ_{rafs} (research_activity_financial_supports) ρ_{fst} (financial_support_types)

Financial_records_of_institute $\longleftarrow \sigma_{institute\_id='test\_id'}$ (rafs $\bowtie_{rafs.type\_id=fst.id}$ fst)

$\pi_{institute\_id,research\_activity\_id,title,amount,paid\_at}$ (Financial_records_of_institute)

Third Query : institute preferred research areas

ρ_{iwa} (institute_work_areas) ρ_{ra} (research_areas) ρ_i (institutes)

Institute-preferred-research-areas $\longleftarrow$ (iwa $\bowtie_{iwa.area\_id = ra.id}$ ra)$\bowtie_{iwa.institute\_id=i.id}$ i)

$\pi_{institute\_id,name,title}$ (Institute-preferred-research-areas)

Fourth Query : Institute research activities

ρ_{ra} (research_activities) ρ_{rat} (research_activity_types) ρ_p (persons)

Institute-research-activities $\longleftarrow \sigma_{institute\_id='test\_id'}$((ra $\bowtie_{ra.type\_id = rat.id}$ rat)$\bowtie_{ra.officer\_researcher\_id = p.id}$ p)

$\pi_{research\_activity\_id,title,content\_id,is\_international,start\_date,end\_date}$ (Institute-research-activities)

Researchers Reports

First Query : Information of all researchers

ρ_p (Persons) ρ_c (contracts)

researcher_info $\longleftarrow$ (p $\bowtie_{p.id=c.person\_id}$ c)

$\pi_{person\_id,ssn,first\_name,last\_name,birth\_date,email,phone\_number}$(researcher_info)

Second Query : History of a researcher's research activities in a given period SELECT

ρ_{ra} (research_activities) ρ_c (contracts) ρ_{rat} (research_activity_types) ρ_i (institutes)

Participation $\longleftarrow$ (((ra $\bowtie_{ra.id = c.research\_activity\_id}$ c)$\bowtie_{ra.type\_id=rat.id}$ rat) $\bowtie_{ra.institute\_id=i.id}$ i)

Participation-in-period $\longleftarrow$ $\sigma_{person\_id ='test\text{-}person\text{-}id'}$ **AND** (Participation)

(test-start-period<contracts_start_date<test-end-period

OR test-start-period<contracts_end_date<test-end-period

OR contracts_start_date < test-start-period < contracts_end_date)

$\pi_{research\_activity\_id ,\ institute\_name,type,content\_id,is\_international,role,duties,salary,}$

$_{contracts\_start\_date,contracts\_end\_date}$(Participation-in-period)

Third Query : Salary payment records of researcher

$\sigma_{researcher\_id ='test\_id'}$(research_activity_salary_payments)

Research Teams Reports

First Query: Researchers that have mututal research activity with a specific researcher and their activity information

ρ_c (contracts) ρ_{ra} (research_activities) ρ_{rat} (research_activity_types)

ρ_i (institutes) ρ_p (persons)

activities-info $\leftarrow$ $(((c \bowtie_{c.research\_activity\_id \, = \, ra.id} ra) \bowtie_{ra.type\_id=rat.id} rat) \bowtie_{ra.institute\_id=i.id} i) \bowtie_{c.person\_id=p.id} p)$

activitires-of-specific-researcher $\leftarrow \pi_{research\_activity\_id} (\sigma_{person\_id \, ='test\_id'} (c))$

mututal-research-activity $\leftarrow \sigma_{person\_id \, !='test\_id'}$ (activities-info* activitires-of-specific-researcher)

$\pi_{person\_id, first\_name, last\_name, \, research\_activity\_id, content\_id, institute\_name}$ (mututal-research-activity)

Second Query: Researchers that have related research activity with a specific researcher and their activity information

ρ_c (contracts) ρ_{ra} (research_activities) ρ_{rat} (research_activity_types)

ρ_i (institutes) ρ_p (persons) ρ_{raa} (research_activity_areas) ρ_{rarea} (research_areas)-

info $\leftarrow$ $(c * raa) \bowtie_{c.research\_activity\_id \, = \, ra.id} ra) \bowtie_{ra.type\_id \, = \, rat.id} rat) \bowtie_{raa.research\_area\_id \, = \, rarea.id} rarea) \bowtie_{ra.institute\_id \, = \, i.id} i)) \bowtie_{c.person\_id \, = \, p.id} p)$

activity-on-specific-area $\leftarrow \pi_{research\_area\_id} (\sigma_{person\_id \, ='test\_id'} (c* raa))$

$\pi_{person\_id, first\_name, last\_name, \, research\_area\_title, content\_id} (\sigma_{person\_id \, !='test\_id'}$ (info * activity-on-specific-area))

Research Activities Reports

First Query : Information of researchers who've been working in a specific period of date

ρ_p (Persons) ρ_c (contracts)

activity_in_specific_period $\leftarrow$ $\sigma_{\text{test-start-period< start\_date<test-end-period}}$ (c $\bowtie_{\text{c.person\_id = p.id}}$ p)

OR test-start-period< end_date<test-end-period

OR start_date< test-start-period <end_date

$\pi_{\text{person\_id,ssn,first\_name,last\_name,birth\_date,email,phone\_number}}$(activity_in_specific_period)

Second Query: Total financial records and financial records grouped by researcher

ρ_p (Persons) ρ_{rasp} (research_activity_salary_payments rasp)

Total financial records

$\rho_{\text{total\_salary\_paid,research\_activity\_id}}$ ($_{\text{research\_activity\_id}}\mathcal{F}_{\text{SUM amount, research\_activity\_id}}$ (rasp))

financial records grouped by researcher

total-amount $\leftarrow$ $\rho_{\text{total\_salary\_paid,researcher\_id}}$($_{\text{researcher\_id}}\mathcal{F}_{\text{SUM amount ,researcher\_id}}$(rasp))

$\pi_{\text{person\_id,first\_name,last\_name,total\_salary\_paid}}$ (total-amount $\bowtie_{\text{rasp.researcher\_id= p.id}}$ p)