

UNIVERSIDAD NACIONAL
AUTÓNOMA DE MÉXICO

FUNDAMENTOS DE BASES DE
DATOS

Tarea 4: Álgebra Relacional

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Ejercicio 1

- a) Toda la información de los usuarios que tienen una página, pero no incluyen blog.

$r = \pi_{\text{user, pagina, titulo_blog}} (\text{Usuario} \bowtie \text{Página} \bowtie \text{Blog})$

$p = \text{user} \gamma_{\text{count}(\text{pagina}) \rightarrow \text{num_p}} (r)$

$b = \text{user} \gamma_{\text{count}(\text{titulo_blog}) \rightarrow \text{num_b}} (r)$

$Q = p \bowtie b$

$\pi^* (\sigma_{\text{num_b} = 0 \wedge \text{num_p} > 0} (Q))$

- b)
c)
d) Jero
e)

Ejercicio 2

- a)
b) ¿Qué fabricantes producen computadoras portátiles con un disco duro de menos 100 GB?

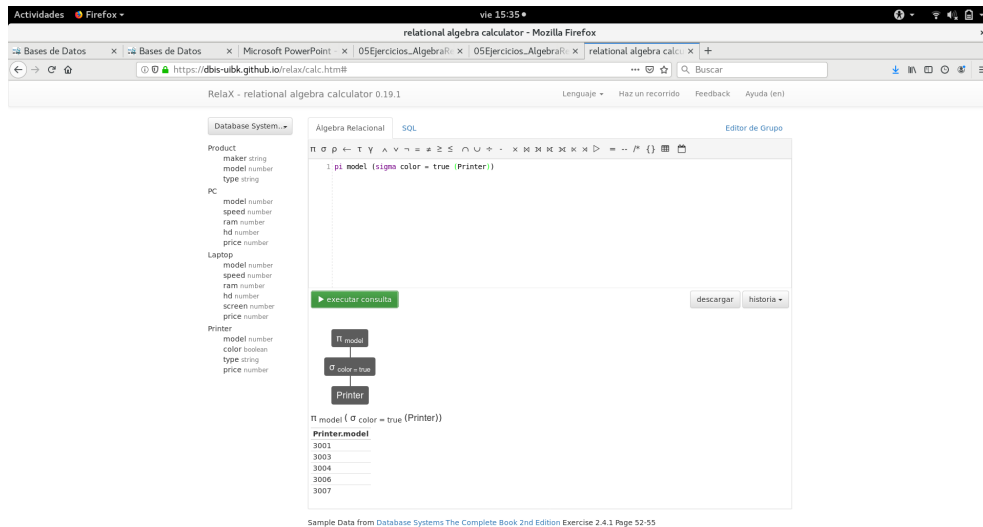
The screenshot shows the Relax relational algebra calculator interface. On the left, there is a 'Database System' sidebar with a tree view containing 'Product', 'PC', 'Laptop', and 'Printer'. The main area displays a query in the 'Algebra Relacional' tab: $\pi_{\text{maker}} (\sigma_{\text{hd} < 100} (\text{Product} \bowtie \text{Laptop}))$. Below the query, there is a green 'ejecutar consulta' button. To the right of the query, there are 'descargar' and 'historia' buttons. Below the query, an execution plan is shown as a tree diagram: a root node π_{maker} connected to a node $\sigma_{\text{hd} < 100}$, which is connected to a join node \bowtie , which in turn connects to 'Product' and 'Laptop' nodes. Below the execution plan, the result of the query is displayed as a table with columns 'maker' and 'hd', showing rows for 'A', 'E', and 'F'.

- c) $r = \sigma_{\text{fabricante} = 'B'} (\text{Producto})$
 $s = \pi_{\text{modelo, precio}} (\text{Laptop}) \cup \pi_{\text{modelo, precio}} (\text{PC}) \cup \pi_{\text{modelo, precio}} (\text{Printer})$

precio (Impresora)
 π modelo, precio ($s \bowtie r$)

d)

e) Encontrar los números de modelo de todas las impresoras láser a color.



f) $r = \pi$ modelo, fabricante (Producto)
 $s = \pi$ fabricante (π modelo (Laptop) \bowtie r)
 $t = \pi$ fabricante (π modelo (PC) \bowtie r)
 $s - t$

g)

h) Encontrar toda la información de las PCs que tienen la misma velocidad y RAM.

i) $r = \pi$ modelo (σ velocidad ≥ 2.8 (PC))
 $s = \pi$ modelo (σ velocidad ≥ 2.8 (Laptop))
 π fabricante ($(r \cup s) \bowtie$ Producto)

j)

k) Encontrar los fabricantes de PC con al menos tres velocidades diferentes.

- l) $r = \pi$ modelo, fabricante (Producto \bowtie PC)
 $s = \gamma$ fabricante; $\text{count}(\text{modelo}) \rightarrow \text{numproductos}(r)$
 π fabricante ($\sigma \text{ numproductos} = 3$ (s))

m)

- n) Crear un reporte que muestre por fabricante, el número de productos que tiene de cada tipo.

- ñ) $r = \pi$ modelo (σ fabricante = 'E' (Producto)) \bowtie Laptop
 $s = \sigma \text{ hd} < 200$ (r)
 $t = \pi$ modelo, velocidad, ram, $\text{hd_nuevo} \leftarrow \text{hd} * 1.15$, pantalla,

relational algebra calculator - Mozilla Firefox

Product
 maker string
 model number
 type string

PC
 model number
 speed number
 ram number
 hd number
 price number

Laptop
 model number
 speed number
 ram number
 hd number
 screen number
 price number

Printer
 model number
 color boolean
 type string
 price number

relational algebra calculator - Mozilla Firefox

1 tau speed, ram pi model, speed, ram, hd, price (PC)

ejecutar consulta

descargar historia

T speed asc, ram asc pi model, speed, ram, hd, price (PC)

PCmodel	PCspeed	PCram	PChd	PCprice
1009	1.42	512	80	478
1011	1.86	2048	160	959
1009	2	1024	250	650
1002	2.1	512	250	995
1007	2.2	1024	200	510
1008	2.2	2048	250	770
1001	2.66	1024	250	2114
1004	2.8	1024	250	649
1012	2.8	1024	160	649
1010	2.8	2048	300	770
1013	3.06	512	80	529
1005	3.2	512	250	630
1006	3.2	1024	320	1049

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relational algebra calculator - Mozilla Firefox

Product
 maker string
 model number
 type string

PC
 model number
 speed number
 ram number
 hd number
 price number

Laptop
 model number
 speed number
 ram number
 hd number
 screen number
 price number

Printer
 model number
 color boolean
 type string
 price number

relational algebra calculator - Mozilla Firefox

1 r = pi maker, speed (Product join PC)
 2 s = gamma maker; count(speed) -> velocidades (r)
 3 pi maker (sigma velocidades >= 3 (s))

ejecutar consulta

descargar historia

Diagram showing the execution of the query:

```

graph TD
    Product --> Join(( ))
    PC --> Join
    Join --> Count[COUNT(speed)]
    Count --> Filter[velocidades >= 3]
    Filter --> Result[pi maker]
  
```

Result: pi maker (sigma velocidades >= 3 (gamma maker; COUNT(speed)->velocidades (pi maker, speed (Product join PC))))

Product.maker
 A
 D
 E

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precio (s)

t

o)

p) Jero

q)

relational algebra calculator - Mozilla Firefox

lun 10:03

relational algebra calculator - Mozilla Firefox

https://dbis-ubbk.github.io/relax/calc.html#

maker string
model number
type string

PC
model number
speed number
ram number
hd number
price number

Laptop
model number
speed number
ram number
hd number
screen number
price number

Printer
model number
color boolean
type string
price number

```

1 r = pi maker, model, type (Product)
2 g = gamma maker, type; count(model) -> tipo (r)
3 pi maker, type, tipo g

```

▶ ejecutar consulta

descargar historia

Diagram showing the execution of the query:

```

graph TD
    A["Pi maker, tipo, tipo"] --> B["Y maker, type; COUNT(model)-tipo"]
    B --> C["Pi maker, model, tipo"]
    C --> D["Product"]

```

Product-maker Product-type tipo

Product-maker	Product-type	tipo
A	pc	3
A	laptop	3
B	pc	4
C	pc	1
D	pc	3
D	printer	2
E	pc	3
E	laptop	3
E	printer	3
F	laptop	2
G	laptop	1
H	printer	2

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