

# Homework 1

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## Question 1

- (a)  $\Pi_{\text{person\_name}}(\sigma_{\text{company\_name} \neq \text{BigBank}}(\text{works}))$
- (b)  $\Pi_{\text{person\_name}}(\text{employee})$  because the query could be defined in English better as “find the name of every employee.” Or, if you prefer the redundant version,

$$x \leftarrow \min (\Pi_{\text{salary}}(\text{works})),$$

$$\Pi_{\text{person\_name}}(\sigma_{\text{salary} > x}(\text{works}))$$

- (c)  $\Pi_{\text{employee.person\_name}}(\text{employee} \bowtie_{\text{employee.city} = \text{company.city}} \text{city})$

## Question 2

- (a)
- branch: branch\_name
  - customer: ID
  - loan: loan\_number
  - borrower: ID
  - account: account\_number
  - depositor: ID
- (b)
- branch: loan.branch\_name, account.branch\_name
  - customer: borrower.ID, depositor.ID
  - loan: borrower.loan\_number
  - borrower: customer.ID, depositor.ID
  - account: depositor.account\_number
  - depositor: customer.ID, borrower.ID

## Question 3

$$\Pi_{\text{depositor.ID}} \left( \text{account} \bowtie_{\text{account.account\_number} = \text{depositor.account\_number} \wedge \text{account.balance} > 6000} \text{depositor} \right)$$

## Question 4

- recipe(name, author, prep\_time, cook\_time, instructions)
- ingredient(name, recipe, amount\_needed, unit, contains) (contains will store a non-empty string listing any allergens that may be contained in the ingredient)
- cookware(name, recipe, amount\_needed, dimension, material)
- stock(ingredient, quantity, supplier, use\_by, location)
- appliance(name, recipe, available, needed, time\_needed)

## Question 5

I filled it out :>