MID-TERM SOLUTION

1. Animal Table: genus, species, description  
   specimen Table: genus, species, name, date-acquired, place-acquired  
   feedings Table: genus, species, name, time, date, what-fed, quantity  
   veterinarian Table: vet-ID, name, specialty  
   Specimen-veterinarian Table: genus, species, name, vet-ID  

   Note: Keys are underlined. No need for Animal-specimen and Animal-feedings table.

2a. Description: Find all customers of the bank who have an account but not a loan.

   RESULT  customer-name
   Johnson
   Turner
   Lindsay

2b. Description: Find all customers who have a loan at the Downtown branch.

   RESULT  branch-name  loan-number  amount  customer-name
   Downtown  L-17  1000  Jones
   Downtown  L-17  1000  William
   Downtown  L-14  1500  Jackson

2c. Description: Find the largest branch assets in the bank.

   RESULT  assets
   9000000

2d. Description: Find the names of all branches with customers who have an account in the bank and who live in Rye.

   RESULT  branch-name
   Mianus
3a. branch_asset ← $\pi_{\text{branch-name}} (\sigma_{\text{assets} > 500000} (\text{branch}))$
   cust_acct ← $\pi_{\text{customer-name}} (\text{depositer} \bowtie \text{account} \bowtie \text{branch_asset})$
   cust_loan ← $\pi_{\text{customer-name}} (\text{borrower} \bowtie \text{loan} \bowtie \text{branch_asset})$
   result ← cust_acct $\cap$ cust_loan

3b. rye ← $\pi_{\text{customer-name}} (\sigma_{\text{customer-city} = 'Rye'} (\text{customer}))$
   loan_rye ← borrower $\bowtie$ rye
   result ← SUM amount (loan $\bowtie$ loan_rye)

3c. horseneck ← $\pi_{\text{branch-name}} (\sigma_{\text{branch-city} = 'Horseneck'} (\text{branch}))$
   cust_acct ← $\pi_{\text{customer-name}} (\text{depositer} \bowtie \text{account} \bowtie \text{horseneck})$
   cust_loan ← $\pi_{\text{customer-name}} (\text{borrower} \bowtie \text{loan} \bowtie \text{horseneck})$
   result ← count-distinct (cust_acct $\cup$ cust_loan)

4a. 

<table>
<thead>
<tr>
<th>RESULT</th>
<th>branch-city</th>
<th>avg(assets)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brooklyn</td>
<td>8050000</td>
<td></td>
</tr>
<tr>
<td>Palo Alto</td>
<td>2100000</td>
<td></td>
</tr>
<tr>
<td>Horseneck</td>
<td>3366667</td>
<td></td>
</tr>
<tr>
<td>Bennington</td>
<td>300000</td>
<td></td>
</tr>
<tr>
<td>Rye</td>
<td>3700000</td>
<td></td>
</tr>
</tbody>
</table>

4b. 

<table>
<thead>
<tr>
<th>RESULT</th>
<th>customer-name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hayes</td>
<td></td>
</tr>
<tr>
<td>Jackson</td>
<td></td>
</tr>
</tbody>
</table>

4c. 

<table>
<thead>
<tr>
<th>RESULT</th>
<th>branch-name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Downtown</td>
<td></td>
</tr>
</tbody>
</table>