Exercises

1. Use a DFD diagramming to draw DFD’s for the following:
   Admission procedure in a University. An advertisement is issued giving essential qualifications for the course, the last date for receipt of application, and the fee to be enclosed with the application. A clerk in the Registrar’s office checks the received applications to see if marksheet and fee are enclosed and sends valid applications to the concerned academic department. The department checks the application in detail and decides the applicants to be admitted, those to be put in the waiting list, and those rejected. Appropriate letters are sent to the Registrar’s office which intimates the applicant. Give physical and logical DFDs corresponding to the above problem.

2. Use a DFD diagramming to draw DFD’s for the following:
   A magazine is published monthly and is sent by post to its subscribers. Two months before the expiry of subscription, a reminder is sent to the subscribers. If subscription is not received within a month, another reminder is sent. If renewal subscription is not received up to two weeks before the expiry of the subscription, the subscriber’s name is removed from the mailing list and the subscriber informed. Obtain logical DFDs for this problem.

3. Use a CASE tool to format and check structured English processing rules for the following:
   An organization maintains an employee file in which each record has following data:
   { Employee No., employee name, employee gross pay}. It has been decided to increase the pay as per the following formula:
   For pay of Rs. 1000 or less increase 15%.
   For pay of more than Rs. 1000 but up to Rs. 2500 increase 10%.
   For pay over Rs. 2500 increase 5%.
   (i) While employee records left in file do
       Read Number, name, gross pay
       if gross pay <=1000
           then increase = gross pay, 0.15
       else if gross pay <= 2500
           then increase = gross pay, 0.1
       else increase = gross pay, .05
       end if
       end if
       Gross pay = gross pay + increase
       Write Number, name, gross pay
   end while
   (ii) While employee records left in file do
       Read Number, name, gross pay
       do Table
       Gross pay <= 1000        Y   N   N
       Gross pay <= 2500        –   YN
       Percent increase           15  10  5
       end while
4. Use a structured English process description tool to obtain Structured English description for the following:

An offshore gas company bills its customers according to the following rate schedule:

First 500 litres Rs. 10 (flat)
Next 300 litres Rs. 1.25 per 100 litres
Next 30,000 litres Rs. 1.20 per 100 litres
Next 100,000 litres Rs. 1.10 per 100 litres
Above this Re. 1.00 per 100 litres

The input record has customer identification, name and address, meter reading, past and present.

5. Obtain system flow chart using appropriate tools for Exercises 3 and 4 above.

6. Use Decision Table checking tool to check the following Decision table.

<table>
<thead>
<tr>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
<th>R5</th>
<th>R6</th>
<th>R7</th>
<th>R8</th>
<th>R9</th>
<th>R10</th>
<th>R11</th>
<th>R12</th>
<th>R13</th>
<th>R14</th>
<th>R15</th>
<th>R16</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1: Door open?</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>C2: Ring sign on?</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>C3: Enter sign on?</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>C4: Door locked?</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
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<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Ring bell</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>?</td>
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<td>X</td>
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<td>Enter</td>
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<tr>
<td>Wait</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>?</td>
<td>?</td>
<td>X</td>
<td>?</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Leave</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>?</td>
<td>?</td>
<td>X</td>
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<td></td>
</tr>
<tr>
<td>A1</td>
<td>A2</td>
<td>A3</td>
<td>A4</td>
<td>A1</td>
<td>A4</td>
<td>A1</td>
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<td>A1</td>
<td>A2</td>
<td>A3</td>
<td>A4</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

7. Use Decision Table checking tool for the following Decision table:

| C1: This week’s cash > weekly rate | N | Y | Y | N | N | N | N | N |
| C2: This week’s cash > 0 | Y | N | N | N | Y | N | N | N |
| C3: Any cash during last month | Y | N | N | Y | Y | Y | N | N | N | Y |
| C4: Arrears > 2 * weekly rate | N | N | N | N | Y | Y | N | N | N |
| C5: Arrears > 4 * weekly rate | N | N | Y | Y | N | N | N | Y | N |
| Send arrears letter A | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Send arrears letter B | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Send arrears letter C | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Send arrears letter D | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Notify accounts | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Take special action | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

8. Use ER-Diagramming tool to solve the following

(i) Customer withdraws money from his account.
(ii) Students write examinations.
(iii) Students attend classes.
(iv) Professors write books.
(v) Driver drives a car.

9. Use ER-Diagramming tool to solve the following
   (i) A bill is sent to a customer. A customer can receive many bills.
   (ii) A clerk works in a bank. The bank has many clerks.
   (iii) A part is used in many products and a product uses many parts.
   (iv) Students apply for seats in colleges. Each student can at most get one seat.
       A college has many seats. A student can send many applications.
   (v) A car is owned by a person. The person can own many cars.

10. Use ER-Diagramming tool to solve the following:
    Use any reasonable assumptions. “A machine shop produces many parts which it
takes on contract. It employs many machinists who operate any of the machines.
A part needs working on only one machine. A record is kept on the quantity of
material needed for producing each part. The production of each part is tracked by
giving a job number, start time and end time and machinist identification.”

11. Design an input screen using a tool to reserve tickets in a long distance bus.

12. Design an input screen using a tool to enter examination marks of students. Each
    record has Roll no, Name, Marks in all subjects, total and class.