**Chapter 5a - Review Questions**

1. **Describe data and process modeling, and name the main data and process modeling techniques**

* The Data and Process Modeling shows how a proposed system takes data and converts it into useful information. A logical model is created during this process, which shows what the system has to do regardless of how it is implemented. During this process, several techniques are used. They are listed below:
  1. DFD (Data Flow Diagram) – Shows how data moves through the system without showing the processing steps. In other words it shows what the system does, but not how it does it. There are four basic symbols used in a DFD and they represent the following:
     + Process – Receive input data and then produce output that is different in content, form or both.
     + Data Flows – A path for data to move from one part of the system to another.
     + Data Stores – Represents data that the system stores for later use by one or more process.
     + Entities – Receive output from the system or provide data to a system.

The DFD starts with a Context Diagram which is a top-down of the system that shows the system’s boundaries and scope. The drawing starts with a process symbol which represents the entire system, and is identified as process 0 (zero). To show the details of the system, you would create a DFD Diagram which zooms in on the system and shows the major internal processes, data flows and data stores involved. An analyst uses techniques called leveling (creating a series of increasingly detailed diagrams until all functional primitives are identified) and balancing (ensuring all input and output data flows of the parent DFD are maintained on the lower level DFD) to ensure the integrity and consistency throughout the various DFDs.

1. Data Dictionary (Data Repository) – A central storehouse of information about the system’s data. They are used to collect, document, and organize facts about the system including the contents of data flows, data stores, processes and entities. It also defines and describes the data elements and their combinations.
2. Process Description – Documents the details of a functional primitive and represents a specific set of processing steps and business logic. Using process description tools helps create a model that is accurate, complete, and concise. Typical tools include structured English, decision tables, and decision trees.
   1. **Describe the Gane and Sarson symbols used for processes, data flows, data stores, and entities. Give four examples of typical names for processes, data flows, data stores, and entities.**
      * The Gane and Sarson symbols used in a DFD are as follows:
3. Processes – The symbol for a process is a rectangle with rounded corners. The name of the process appears within the rectangle. Some examples of process names are ASSIGN FINAL GRADE, APPLY RENT PAYMENT, VERIFY ORDER, and FILL ORDER.
4. Data Flows – The symbol for data flows is a line with a single or double arrow. The name for the data flow appears above, below, or alongside the line. Some examples of data flow name are STUDENT GRADE, ORDER, COMMISION, and DEPOSIT.
5. Data Stores – The symbol for data stores is a flat rectangle that is open on the right side and closed on the left side. The name for the data flow appears between the lines, and identifies the data it contains. Some examples of data flow names are STUDENTS, PRODUCTS, EMPLOYEES, and INSURANCE POLICIES.
6. Entities – The symbol for an entity is a rectangle, which can be shaded to make it look three-dimensional. The name of the entity appears within the rectangle. Only external entities that provide data to a system or receive output from a system are represented in a DFD. Some examples of entity names are CUSTOMER, BANK, PATIENT, and PAYROLL DEPARTMENT.
   1. **What is the relationship between a context diagram and diagram 0, and which symbol is not used in a context diagram?**
      * Context diagram and diagram 0:
        1. Context Diagram – Is a top-down of the system that shows the system’s boundaries and scope. The drawing starts with a process symbol which represents the entire system, and is identified as process 0 (zero). Data stores are not shown in a context diagram because they are maintained within the system and remain hidden until more detailed diagrams are created.
        2. Diagram 0 – zooms in on the system and shows the major internal processes, data flows and data stores involved. It also repeats the entities and data flows that appear in the context diagram. This would be the more detailed diagram mentioned above.
   2. **What is meant by an exploded DFD?**

* An exploded DFD is also known as leveling, which uses a series of increasingly detailed DFDs to describe an information system. Diagram 0 is an exploded version of the context diagram. When you explode a DFD, the higher-level diagram is called the parent diagram and the lower-level diagram is called the child diagram.
  1. **Describe a data dictionary and give examples of how and when it is used**
* A data dictionary is a central storehouse of information about the system’s data. Analysts use the data dictionary to collect, document and organize specific facts about the system, including contents of data flows, data stores, entities, and processes. It also defines and describes all data elements and combinations of data elements. A data element is the smallest piece of data that has meaning within an information system. The data elements are combined into records also called data structures. Records are meaningful combinations of related data elements that are included in a data flow or retained in a data store. You must document every data element in the data dictionary. The dictionary is updated constantly as the system is implemented, operated and maintained.

**Chapter 5a - Personal Trainer, INC**

1. **Prepare a context diagram for the new system.**

* **Context diagram for the new system.**

CHARGE

AND

PAYMENT

DATA

TREND

DATA

ACCOUNTING

RESULTS

CONFIRM

AVAILABILITY

ASSIGNED

ACTIVITY

SCHEDULE

DECISIONS

TREND

REPORTS

ACCOUNTING

REPORTS

ACTIVITY

DATA

CONFIRM ACTIVITY

REQUEST

PAYMENT

REQUEST ACTIVITY

INVOICE

PERSONAL TRAINER ACCOUNTING SYTEM

MANAGER

0

PERSONAL TRAINER INFORMATION MANAGEMENT SYSTEM

MEMBER

INSTRUCTOR

ACTIVITY

1. **Prepare a diagram 0 DFD for the new system.**

* Diagram 0 DFD for the new system.

REQUEST ACTIVITY

PAYMENT

INVOICE

TREND

DATA

TREND

REPORTS

MEMBER

DATA

CHARGE AND

PAYMENT DATA

ACCOUNTING

RESULTS

ACCOUNTING

DATA

CONFIRM

ACTIVITY REQUEST

D1

D3

D2

ACTIVITY DATA

ASSIGNED

ACTIVITY

CONFIRM

AVAILABILITY

ACCOUNTING

REPORTS

2

INTERFACE

WITH

ACCOUNTING

SYSTEM

1

MANAGE

MEMBEMSHIP

AND

CHARGES

SCHEDULE DECISIONS

MEMBER

AREA

CURRENT

SCHEDULE

SCHEDULE

DATA

ACTIVITY

DATA

ACTIVITY

DATA

INSTRUCTOR

MANAGER

4

ANALYZE

SALES AND

MARKETING

TRENDS

3

SCHEDULE

COURSES

AND

ACTIVITIES

PERSONAL TRAINER ACCOUNTING SYTEM

MEMBER

ACTIVITY

**Chapter 5a - Case in Point 5.1: Pg. 217 – List the Errors for BIG TEN UNIVERTITY**

Following are the errors I was able to find in the Diagram 0 DFD:

1. Process 3 (CHECK OPEN CLASSES) has no output – Problem here is a Black Hole.
2. The Data Flow between Data Stores (D5 & D6) is not allowed.
3. The Data Store D6 has no outgoing data flow.
4. Data Store D4 has no outgoing data flow.
5. External Entities INSTRUCTOR and STUDENTS are connected by a data flow, which is not allowed.
6. Data Store D6 is connected by a data flow to external entity Instructor which is not allowed.
7. Data flow Student ID Number leading into Process 4 (Calculate Grade) is an example of a Gray Hole, because the input would not be able to produce the output Final Grade.