

CHAPTER TWO ANSWERS

Checkpoint 2.1

1. *What does it mean to say a field has unique values?*

"Unique values" means that no two records have or ever will have the same value for that field.

2. *Why is it desirable to have a key be unique?*

If there were several values for a key field, when you used the key to find a record, you'd get several results. The point of a key is to identify one and only one record.

3. *Why does a file have to be organized by a key field?*

The key is the only practical way to find records. Suppose the file above consisted of thousands of records and suppose it were keyed by name. Now suppose that the 3x5 cards were in a barrel in random order (disorganized). What good would the key be? To organize a file, you need (a) a key and (b) the data in the file must be accessible by the key.

4. *What does "null" mean?*

It means unknown - it can also mean "not recorded," "not known," "not available," or "known, but not recorded." The point is that as far as the record is concerned, the value of the field is unknown.

5. *Consider this customer file:*

| | | | | |
|-----------|------------|--------------|---------------|-------------|
| Record 1: | 77 A St | Adams, A | Pensacola FL | 555-5847 |
| Record 2: | Charles, X | 365 Broad St | 555-8214 | Mobile AL |
| Record 3: | 555-1234 | Harris, H | 92 Adams Lane | Elberta, AL |

What is wrong here?

First of all, the file design is not given, but whatever it is, the records are not following it. The record number does not have to come first, but rather, the fields must follow the file design whatever it is. If the file design were

Customer (telephone, name, address, city, record_no), then all records must conform to it. The corrected file would be this:

| | | | | |
|----------|------------|---------------|--------------|----------|
| 555-5847 | Adams, A | 77 A St. | Pensacola FL | Record 1 |
| 555-8214 | Charles, X | 365 Broad St | Mobile AL | Record 2 |
| 555-1234 | Harris, H | 92 Adams Lane | Elberta, AL | Record 3 |

Checkpoint 2-2

1. What is a sequential file?

A file of data organized on some key, e.g., name

2. What is COBOL?

COBOL was a pervasive computer language used to write programs. COBOL was the languages of choice for serious computer filing systems in the 60's and 70's.

3. Why is ordering important in a sequential filing system?

Ordering by some key is the way to find data. If a file were ordered by name, then as you looked for a name, e.g., Jones, you'd quickly pass all names up to J, then look within the J's much like you'd find a name in an old-fashioned telephone directory. If data were not ordered, you'd have to look at each record until you found what you wanted.

4. What is a database program?

A database program is a pre-written set of programs to manage data.

5. In the "early days" how was data put into a file?

It was input via punched cards and then programs caused the inputted data to be written on a disk or tape.

Checkpoint 2-5

1. *What are the three main data models we have discussed?*

Hierarchical, Network and Relational

2. *Which data model is mostly used today? Why?*

The relational model. This model does not depend on hardware links and delivers powerful flexibility.

3. *What are some of the disadvantages of the hierarchical data model?*

The hierarchical model is a 1:M model. If a situation requires M:N (many to many) relationships, then the model has to be implemented with redundant data. As with the network model, you also have the drawback of physical links among records in files. Physical links are fragile and they tie you to one system of retrieval for better or worse.

4. *What are some of the disadvantages of the network data model?*

In addition to all of the problems with physical links which one has in the hierarchical model, as the linking moves from 1:M to M:N, it becomes far more complicated. Additional linking presents more opportunity for failure.

5. *How are all relationships (mainly the cardinalities) described in the hierarchical data model? How can these be a disadvantage of the hierarchical data model?*

All relationships in the hierarchical model have a cardinality of 1:M (one to many). If a situation arises where an M:N relationship is required, then a workaround is required in the hierarchical model.

6. *How are all relationships (mainly the cardinalities) described in the network data model? Would you treat these as advantages or disadvantages of the network data model?*

In the network model, M:N relationships are allowed. The allowance of these relationships causes the complexity of the pointing scheme (whatever it is) to rise exponentially. While many of the database systems in the 70's were implemented this way and implemented well, the model

gave way to the simplicity and uncomplicated relational model in the 80's.

7. *What are structural constraints?*

Structural constraints are the cardinality and optionality of a relationship. Cardinality tells us how many of parent records are related to child records (e.g., 1:M or M:N). Optionality tells us may or must (e.g., each golfer *may* be playing today, each golfer *must* have a set of golf clubs.

8. *Why was Codd's promise of the relational model better?*

Codd's model did away with physical pointers and a need to maintain them. The database was just data, albeit data arranged in an uniform way.