Database Models

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Hierarchical Data Model :

1. Hierarchical data model is the oldest type of the data model. It was developed by IBM in 1968.

2. In hierarchical model, Data is organized into a tree like structure with each record is having one parent record and many children.

3. The main drawback of this model is that, it can have only one to many relationships between nodes.

4. Hierarchical models are rarely used now.

Lets say we have few students and few courses and a course can be assigned to a single student only, however a student take any number of courses so this relationship becomes one to many.
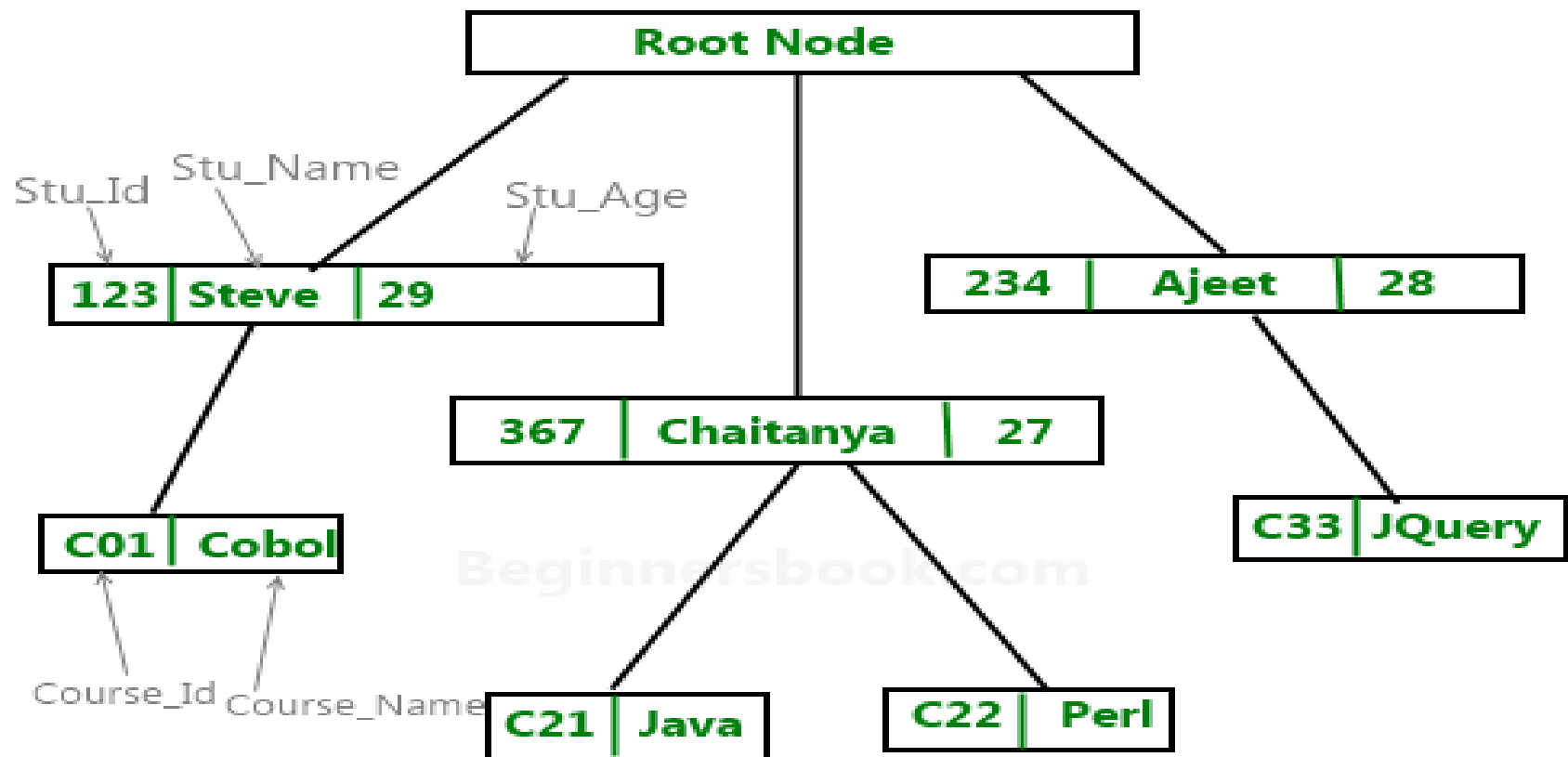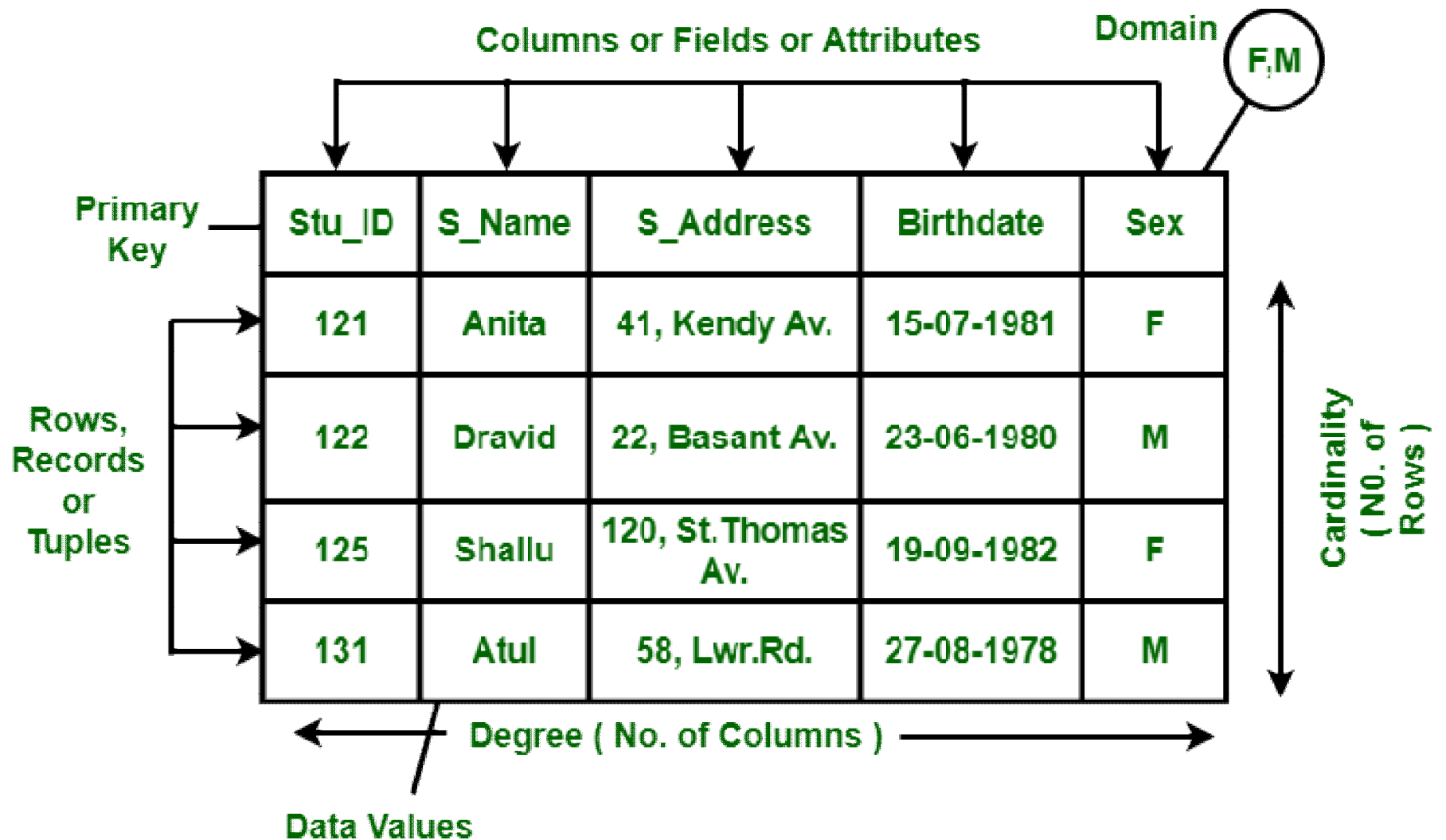
Network Data Model :

It is the advance version of the hierarchical data model. To organize data it uses <mark>directed graphs</mark> instead of the tree-structure. In this <mark>child can have more than one parent.</mark>
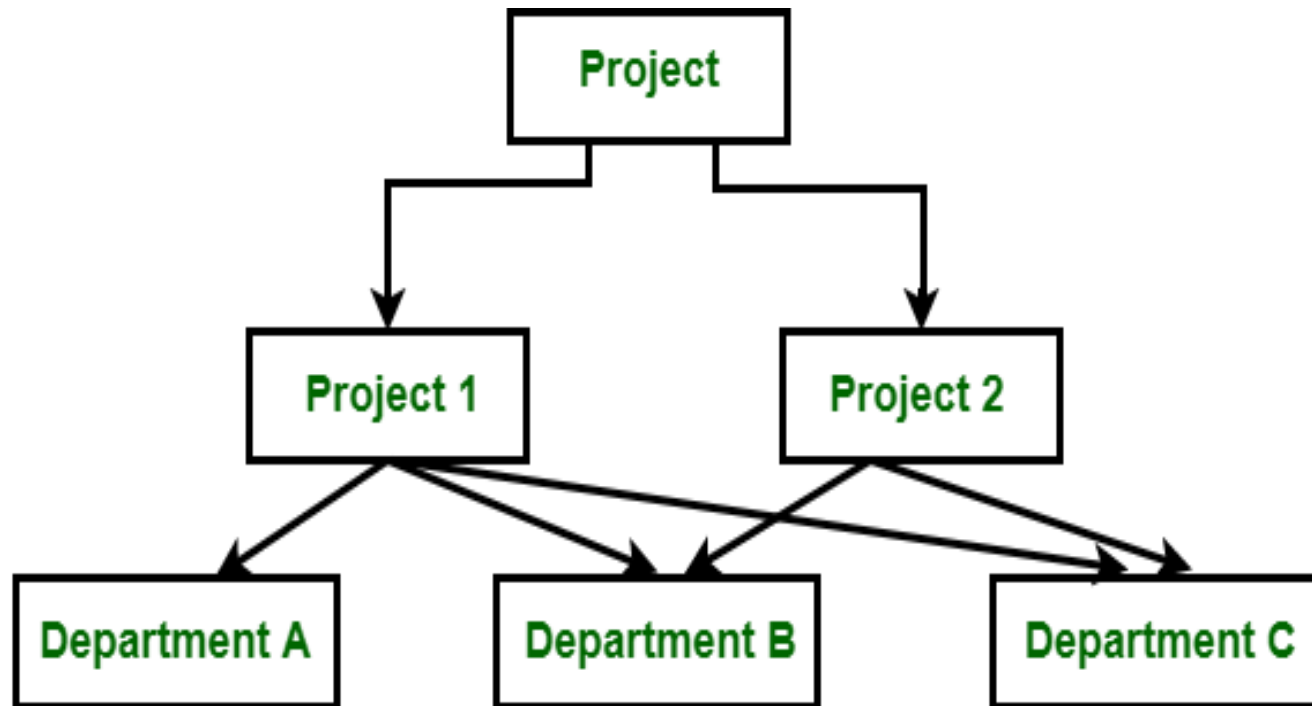
Relational model:

1. The relational data model was developed by E.F. Codd in 1970.

2. The most recent and popular model of data-base design is the relational database model.

3. This model was developed to overcome the problems of ==complexity and inflexibility== of the earlier two models in handling databases with ==many-to-many== relationships between entities.

Columns or Fields or Attributes

Domain (F,M)

Stu_ID	S_Name	S_Address	Birthdate	Sex
121	Anita	41, Kendy Av.	15-07-1981	F
122	Dravid	22, Basant Av.	23-06-1980	M
125	Shallu	120, St.Thomas Av.	19-09-1982	F
131	Atul	58, Lwr.Rd.	27-08-1978	M

Primary Key

Rows, Records or Tuples

Cardinality (N0. of Rows)

Degree (No. of Columns)

Data Values

Hierarchical Data Model	Network Data Model	Relational Data Model
In this model, to store data hierarchy method is used. It is the oldest method and not in use today.	It organizes records to one another through links or pointers.	It organizes records in the form of table and relationship between tables are set using common fields.
To organize records, it uses tree structure.	It organizes records in the form of directed graphs.	It organizes records in the form of tables.

Hierarchical Data Model	Network Data Model	Relational Data Model
It implements 1:1 and 1:n relations.	In addition to 1:1 and 1:n it also implements many to many relationships.	In addition to 1:1 and 1:n it also implements many to many relationships.
Insertion anomaly exits in this model i.e. child node cannot be inserted without the parent node.	There is no insertion anomaly.	There is no insertion anomaly.

Hierarchical Data Model	Network Data Model	Relational Data Model
Deletion anomaly exists in this model i.e. it is difficult to delete the parent node.	There is no deletion anomaly.	There is no deletion anomaly.
This model lacks data independence.	There is partial data independence in this model.	This model provides data independence.