**RBD\_1**

**History ( beginning)**

1951

Univac presented *the magnetic tape* as a means to store data. (Before that punched cards were used).

Obraz zawierający tekst, osoba, wewnątrz, stereo

Opis wygenerowany automatycznie

1956

IBM introduced *the magnetic hard drive*.

1961

Integrated Data Store IDS (*Charles Bachman*, General Electric) was the first DBMS. It was the rise of *the network data model*.

1965-70

Information Management System IMS (IBM) - *the hierarchical data model*.

1970

*Edgar Codd (1924-2003)*, IBM –, *the relational data model*.

Obraz zawierający tekst, osoba, pozujący

Opis wygenerowany automatycznie

1971

CODASYL, the standard for the network data model.

1976

Peter Chen - *the entity-relationship model* (ERD, ERM). There is no standard for this model so far (in 2004).

The beginning of the seventies

People at IBM research lab in San Jose develop languge *Sequel*. It was the prototype of SQL. You can still meet "old" people who pronounce SQL as "Sequel". Now you know why they do it.

1973

The first relational database management system (*System R* developed by IBM).

1979

Relational Software (later rebranded to Oracle) marketed the first commercial version of a relational database management system.

1987

The first standard of SQL (ISO).

* Next versions of standard SQL (by ANSI/ISO): 1989, 1992 SQL2, 1999 SQL3 (the object-relational model).
* SQL4 is developed.

The eighties

Reserch on deductive and object-oriented databases.

1997

The standard for object-oriented databases: ODMG 2.0.

Since the nineties till now

Databases have been extended by *new aspects* like multi-tier architectures, distribution, integration, parallel computation, Internet, data warehouses, OLAP, multimedia, databases of documents (also XML), GIS (Geographical Information Systems), ERP (Enterprise Resource Planning), MRP (Management Resource Planning) - packets like SAP, Baan, Oracle, PeopleSoft, Siebel, CRM (Customer Relationship Management).

**Why RELATIONAL database**

**Relations it is a subset of cartesian product**

**A={x,y,z,t} B={%, #, $}**

**AxB={ (a,b): a ꙴ A ,b ꙴ B}**

**{x,y,z,t} x{%, #, $}={(x,%),(x,#),(x,$),**

**(y,%),(y,#),(y,$), (z,%),(z,#),(z,$),**

**(t,%),(t,#),(t,$)}**

**C={1,2,4,6,9}**

**BxAxC={ (%,x,1),(%,x,2),(%,x,4)….($,t,6),($,t,9)}**

**A=COUNTRIES B=CITIES**

**AX B= {( JAPAN, WARSAW), (FRANCE, MADRIT),(JAPAN, TOKYO),(UK, LONDON),…..}**

|  |  |
| --- | --- |
| **COUTRY** | **CITY** |
| **POTRUGAL** | **LISBOA** |
| **IRELAND** | **DUBLIN** |
| **POLAND** | **WARSAW** |

**Relation – any subset of cartesian product.**

**A={1,2,3,4} B={0,1,2} C={1,2,3,4}**

**AxBxC={(1,0,1),(1,1,1),(1,1,2),(1,1,3),(),….(4,2,4)}**

**R1={(x,y,z):x+y=z} x ꙴ A y ꙴ B z ꙴ C**

**R1={(1,0,1),( 1,1,2),(1,2,3)….(3,1,4)}**

**Surname , address, phone number**

**….. …. ….**

Entity ( attribut1, att2, att3,…)

Database

Table ( coll1, coll2,…)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Col1 | Col3 | Col3 |  |  |  |
|  |  |  |  |  |  |
| ,………. | …….. | ……… | ………. | ………. | ……… |
| this | is | one | record | Of the | table |
| 125 | John | Brown | analyst | 12-02-98 | 5000 |

**Model of entities – database**

**Entity- table**

**Attribute- column**

**Instance of the entity – record=row in table**

1. **Database Functionalities**

**-what our application ( computer) can support**

Example **:**

For given specialisation and date finding all doctors having free visit day

Changing category of each book from „travel” to „ geography”

Calculating the total value of all transactions during given week

**NOT :**

**-business rules** (only peoplewho are polite can work with customers)

**-duty of the user** ( adding new contracts to the list)

**-content of tables** (data of customers)

**-entities** ( types of excursions)

**-attributes** ( surname, phone number, number of products bought)

**2) Entities ( definined by attributes)**

**attributes should:**

**- describe the entity for which are defined (not other objects)**

Defining entity STUDENT we may have surname or address but NOT number of colleagues in his group

**- do not change in time (** instead of age date of birth)

**- intersection of column and row must be atomic = 1st NORMAL FORM condition**

**Value is atomic if can not be devided without loosing sense**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Id\_person** | **surname** | **job** | **email** | **~~children~~** |
| **154** | **xxx** | **J1** | **xx@mm.com** | **Alan,Louise,Anthony, Belinda** |
| **458** | **yyy** | **J2** | **yy@mm.com** | **John** |
| **908** | **zzz** | **J3** | **zz@mm.com** | **Peter, Dorothy** |

**- each entity should have a unique identifier**

Product=(**id\_Product**, p\_name, price)

Representant=(**country**, phone\_number)

Colleague=( **f\_name, surname**, hobby)

**- we should avoid redundancy ( every information is obtainable in only one way)**

Excursion=( id\_ex, ~~date\_start, date\_end, number\_of\_days)~~

Date1, date2=> number of days

Date1, number of days=> date2

Price, amount=> cost

Cost, amount=> price

1. **Reporting daily incomes**
2. **Printing receipts for customers**
3. **Keeping records of use of loyalty cards**

**Customer ( idCustomer ,f-name, surname, address, ~~date of purchase~~, ~~price~~ )** *price, date of purchase- is not an attribute of customer*

**Product ( idProduct,name, type, price, ~~number\_of\_products\_in \_the store~~) number of products -***changes in time and it is not an attribute of the product*

**Category(name, reduction\_percent, validity\_period)**

**Individual\_card( idIC, category, date, owner)**

**Purchase ( idPurchase,date, client, product, quantity)**

1. Attribute describes a property of the object which is a name of entity
2. Attribute doesn’t change its value in time
3. Attributes do not generate redundancy
4. First Normal Form requirement is necessary
5. In each entity we have an attribute /s allowing to identify unique records

Functionality:

**Operation which can be done by our application**

( finding all staff members who participated in project a23, for each doctor and each patient finding total number of visits,…)

**NOT:**

-operation done by a person ( to enter data typing -use of keyboard)

-business rule for the company ( in every department we have a meeting once a months, customers can call a head of department)

-entity ( customer, project)

-attribute ( salary of the Staff member)