SWEN304/SWEN439 Database System Engineering

Tutorial 2: EER

week 3, T1, 2021

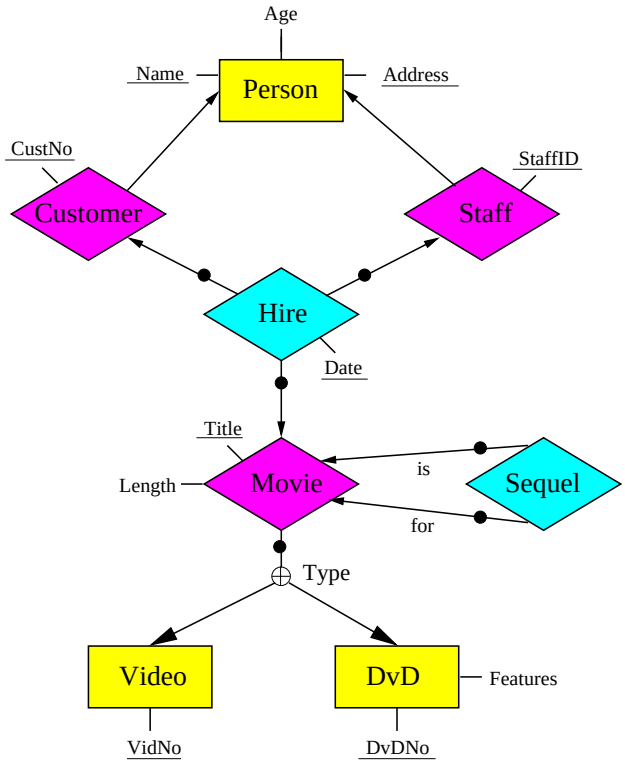
Suppose the local Video shop hires you to design a database for them. They provide you with the following list of requirements. Persons need to be stored with their name, age and address. For customers it is possible to store their customer number, for staff it is possible to store their staff id. The Video shop rents out movies which are either videos or dvds. A video has got a video number, a dvd its dvd number and some features. Further, the shop would like to keep track of sequels, i.e., one movie might be a sequel of another movie. Finally, the shop records when a customer hires a movie from a certain staff member. Therefore, the date needs to be stored as well.

(a) Develop a EERM diagram according to the requirements above. In case you feel there is some information missing, make an appropriate assumption.

(b) Describe the Entity- and Relationship types and Clusters in the EERM diagram from **a)** using their formal definition

i.e. $E = (attr(E), id(E))$, $R = (comp(R), attr(R), id(R))$, and $C = C_1 \oplus \cdots \oplus C_n$

1 HERM-Diagram



2 EERM-Schema

Level 0:
PERSON=({Name, Age, Address}, {Name, Address})
VIDEO=({VidNo}, {VidNo})
DVD=({DvDNo, Features}, {DvDNo})

Cluster of Level 1:
TYPE=VIDEO⊕DVD

Level 1:
CUSTOMER=({PERSON},{CustNo},{CustNo})
STAFF=({PERSON},{StaffID},{StaffID})

Level 2:
MOVIE=({TYPE},{Title, Length},{Title, TYPE})

Level 3: HIRE=({CUSTOMER, STAFF, MOVIE},{Date}, {CUSTOMER, STAFF, MOVIE,Date})
SEQUEL=({is:MOVIE,for:MOVIE},∅, {is:MOVIE,for:MOVIE})

3 RDM Schema

PERSON={Name, Age, Address} with minimal key {Name, Address}
VIDEO={VidNo} with minimal key {VidNo}
DVD={DvDNo, Features} with minimal key {DvDNo}

VIDEO_MOVIE={Title, Length, VideoNo}
minimal key {Title, VideoNo}
foreign key [VideoNo] $\subseteq$ VIDEO[VidNo]

DVD_MOVIE={Title, Length, DvDNo}
minimal key {Title, DvDNo}
foreign key [DvDNo] $\subseteq$ DVD[DvDNo]

CUSTOMER={CustNo, CustName, CustAddress}
minimal key {CustNo}
foreign key [CustName, CustAddress] $\subseteq$ PERSON[Name, Address]

STAFF={StaffID, StaffName, StaffAddress}
minimal key {StaffID}
foreign key [StaffName, StaffAddress] $\subseteq$ PERSON[Name, Address]

SEQUEL_VIDEO={IsSequel_VideoTitle, IsSequel_VideoNo, For_VideoTitle, For_VideoNo}
minimal key SEQUEL_VIDEO
foreign keys:
[IsSequel_VideoTitle, IsSequel_VideoNo] $\subseteq$ VIDEO_MOVIE[Title, VideoNo] and
[For_VideoTitle, For_VideoNo] $\subseteq$ VIDEO_MOVIE[Title, VideoNo]

SEQUEL_DVD={IsSequel_DvDTitle, IsSequel_DvDNo, For_DvDTitle, For_DvDNo}
minimal key SEQUEL_DVD
foreign keys:
[IsSequel_DvDTitle, IsSequel_DvDNo] $\subseteq$ DVD_MOVIE[Title, DvDNo] and
[For_DvDTitle, For_DvDNo] $\subseteq$ VIDEO_MOVIE[Title, DvDNo]

HIRE_VIDEO={CustomerNo, StaffID, VideoTitle, VideoNo, Date}
minimal key HIRE_VIDEO and
foreign keys
[CustomerNo] $\subseteq$ CUSTOMER[CustNo],
[StaffID] $\subseteq$ STAFF[StaffID] and
[VideoTitle,VideoNo] $\subseteq$ VIDEO_MOVIE[Title,VideoNo]

HIRE_DVD={CustomerNo, StaffID, DvDTitle, DvDNo, Date}
minimal key HIRE_DVD and
foreign keys:
[CustomerNo] $\subseteq$ CUSTOMER[CustNo],
[StaffID] $\subseteq$ STAFF[StaffID] and
[DvDTitle,DvDNo] $\subseteq$ DVD_MOVIE[Title,DvDNo]