DRAFT - SOLUTION

Design - Part B

The Students of Technology Exchange Programme (STEP) wishes to design a database to manage its activities.

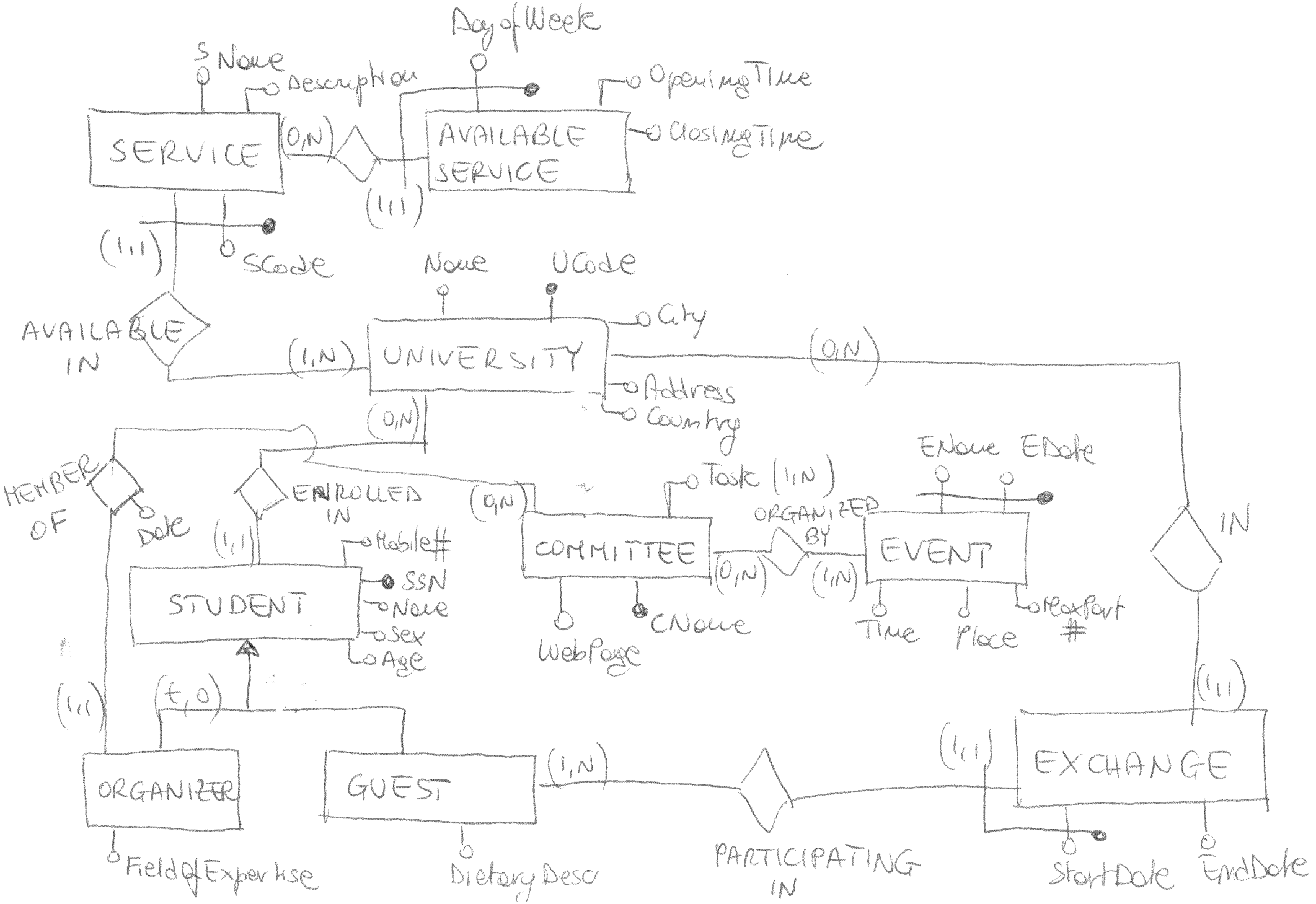
- The universities participating in the STEP programme are characterized by a unique alphanumeric code, the name, the address, the city, and the country.
- A number of services (e.g. Wi-Fi access, tourist information office) are available free of charge in each university for the students enrolled in the STEP programme. Each service is uniquely identified by a numeric code within the university in which it is provided, and characterized by its name and a short description. For each service, the database stores opening and closing times on each day of the week (e.g. Monday 9:00am–6:00pm). Please consider that, on a given day, each service is open in at most one time slot.
- Different committees (e.g. housing committee, sporting committee) are appointed within the STEP programme to be in charge of various tasks. Each committee is identified by its name, and characterized by its web page address and the list of tasks for which it is responsible (e.g. finding accommodation, selecting sponsors, organizing sporting events).
- The events organized within the STEP programme are identified by their name and the date on which they are held. For each event, the time, the place, and the maximum number of participants (if any) are known. In addition, the committees that organize the event are stored.
- The students enrolled in the STEP programme are identified by their social security number (SSN), and characterized by their name, sex, age, mobile phone number and the university in which they are enrolled. Students are divided into organizers and guests. Please note that some students may be both organizers and guests. Organizers are characterized by their main field of expertise (e.g. sports, accounting) and the committee of which they are members, together with the date on which they have joined the committee. Guests are characterized by a description of their specific dietary requirements (if any). For each guest, the database also keeps track of each exchange in which he/she has participated. In particular, the start date, the end date and the hosting university are known for each exchange. Please consider that each guest can take part in one or more exchanges, but he/she cannot participate in more than one exchange in the same period.

(a) *Mandatory* exercise (9 points): Describe the conceptual schema of a database for the above application by means of an ER diagram.

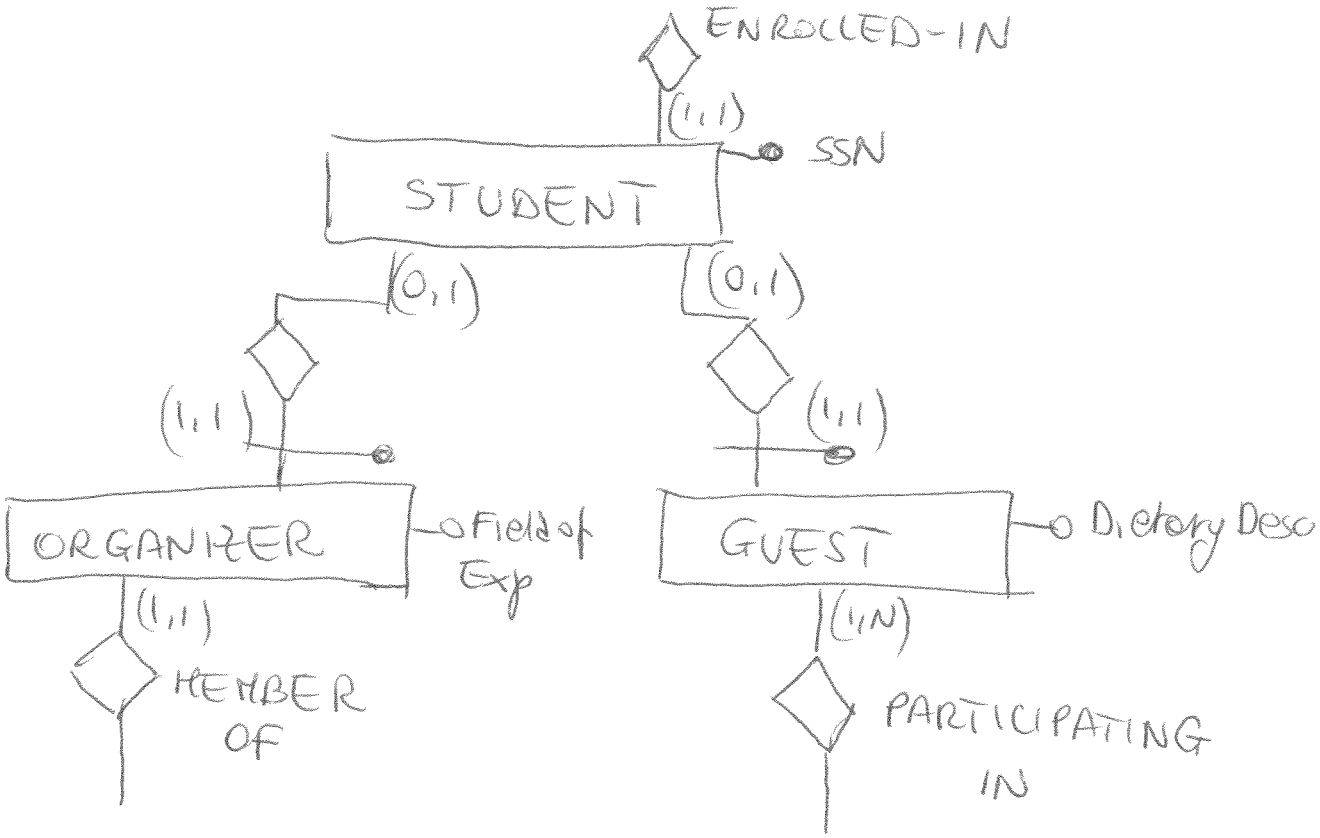
(b) *Mandatory* exercise (4 points): Derive a normalized relational logical schema for the same database.

(c) *Optional* exercise (1 point): Define referential integrity constraints for 3 relations of your choice among those defined in the conceptual schema.

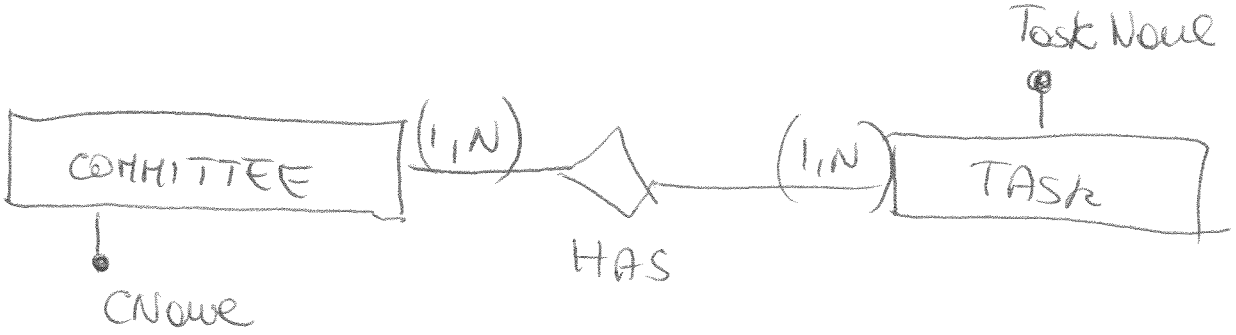
ER - scheme


SName
Description
Day of Week
Opening Time
Closing Time
SERVICE
(0,N)
(1,1)
AVAILABLE SERVICE
(1,1)
SCode
AVAILABLE IN
(1,N)
Name
UCode
City
UNIVERSITY
Address
Country
(0,N)
(0,N)
MEMBER OF
Date
ENROLLED IN
(1,1)
Mobile#
SSN
Name
Sex
Age
STUDENT
(0,N)
Task (1,N)
COMMITTEE
CName
WebPage
(0,N)
ORGANIZED BY
(1,N)
EName
EDate
EVENT
Time
Place
Nexpart #
IN
(1,1)
(1,1)
(t,o)
ORGANIZER
FieldOfExpertise
GUEST
DietaryDesc
(1,N)
PARTICIPATING IN
(1,1)
EXCHANGE
StartDate
EndDate

REMOVING GENERALIZATION



REMOVING MULTI-VALUE ATTRIBUTE



LOGICAL-SCHEMA

SERVICE(UCode, SCode, SName, Description)

AVAILABLE-SERVICE (UCode, SCode, DayOfWeek, OpeningTime, ClosingTime)

UNIVERSITY(UCode, City, Name, Address, Country)

STUDENT (SSN, Mobile#, Name, Sex, Age, UCode)

ORGANIZER (SSN, FieldOfExpertise, CommitteeName, Date)

GUEST (SSN, DietaryDesc)

COMMITTEE (CName, WebPage)

EVENT (EName, EDate, Time, Place, MaxPart#)

ORGANIZER-BY (CommitteeName, EName, EDate)

EXCHANGE (SSN, StartDate, EndDate, UniversityCode)

~~TASK (TaskName)~~

COMMITEE-HAS-TASK (CommitteeName, TaskName)

REFERENTIAL - INTEGRITY - CONSTRAINT

1) Im the CREATE TABLE SERVICE

FOREIGN KEY (UCode)

REFERENCES UNIVERSITY (UCode)

2) Im the CREATE TABLE AVAILABLE-SERVICE

FOREIGN KEY (UCode, SCode)

REFERENCES SERVICE (UCode, SCode)

3) Im the CREATE-TABLE COMMITTEE-HAS-TASK

FOREIGN KEY CommitteeName

REFERENCES COMMITTEE (CName)