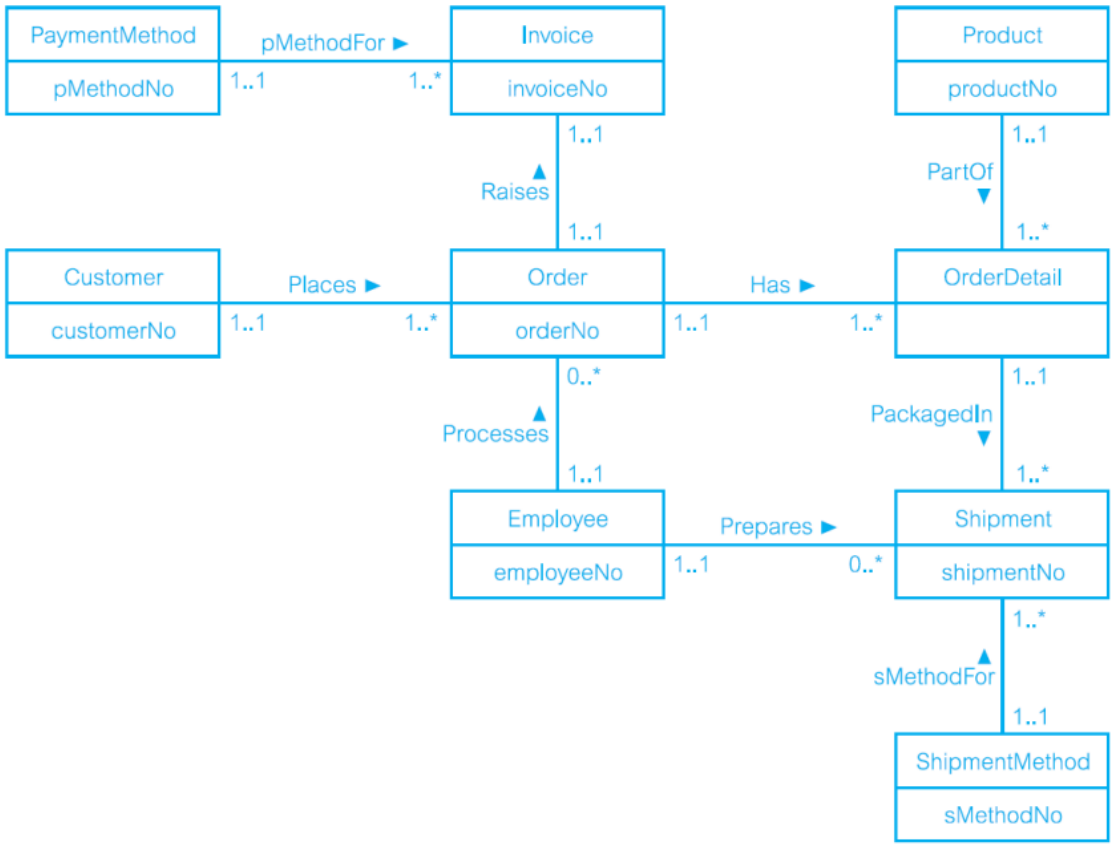
Nama	: Afina Putri Dayanti
NIM	: 825200049
Jurusan	: Sistem Informasi
Mata Kuliah	: Database Design and Management (Teori)

16.8 Derive relations from the following conceptual data model:



- **Customer**
  (customerNo, customerName, customerStreet, customerCity, customerState, customerZipCode, custTelNo, custFaxNo, DOB, maritalStatus, creditRating)
  Primary Key customerNo
  Alternate Key custTelNo
  Alternate Key custFaxNo

- **Employee**
  (employeeNo, title, firstName, middleName, lastName, address, workTelExt, homeTelNo, empEmailAddress, socialSecurityNumber, DOB, position, sex, salary, dateStarted)
  Primary Key employeeNo
  Alternate Key socialSecurityNumber

- **Invoice**
  (invoiceNo, dateRaised, datePaid, creditCardNo, holdersName, expiryDate, orderNo, pMethodNo)

Primary Key invoiceNo
Foreign Key orderNo references Order(orderNo)
Foreign Key pMethodNo references PaymentMethod(pMethodNo)

- **Order**
  (orderNo, orderDate, billingStreet, billingCity, billingState, billingZipCode, promisedDate, status, customerNo, employeeNo)
  Primary Key orderNo
  Foreign Key customerNo references Customer(customerNo)
  Foreign Key employeeNo references Employee(employeeNo)

- **OrderDetail**
  (orderNo, productNo, quantityOrdered)
  Primary Key orderNo, productNo
  Foreign Key orderNo references Order(orderNo)
  Foreign Key productNo references Product(ProductNo)

- **PaymentMethod**
  (pMethodNo, paymentMethod)
  Primary Key pMethodNo

- **Product**
  (productNo, productName, serialNo, unitPrice, quantityOnHand, reorderLevel, reorderQuantity, reorderLeadTime)
  Primary Key productNo
  Alternate Key serialNo

- **Shipment**
  (shipmentNo, quantity, shipmentDate, completeStatus, orderNo, productNo, employeeNo, sMethodNo)
  Primary Key shipmentNo
  Foreign Key orderNo, productNo references OrderDetail(orderNo, productNo)
  Foreign Key employeeNo references Employee(employeeNo)
  Foreign Key sMethodNo references ShipmentMethod(sMethodNo)

- **ShipmentMethod**
  (sMethodNo, shipmentMethod)
  Primary Key sMethodNo

The University Accommodation Office Case Study

15.15 Provide a user's requirements specification for the University Accommodation Office case study documented in Appendix B.1.

15.16 Create a conceptual data model for the case study. State any assumptions necessary to support your design Check that the conceptual data model supports the required transactions.

1.1 Identify entity types

Entity	Description	Aliases	Occurance
student	Penjelasan tentang mahasiswa		Setiap mahasiswa memiliki advisor, course, dan nextOfKin. Dan mahasiswa juga dapat menyewa tempat tinggal (optional)
course	Penjelasan tentang mata kuliah yang diambil mahasiswa		Setiap siswa dapat memilih dan menghadiri 1 course
advisor	Penjelasan tentang pembimbing yang bertanggung jawab dengan mahasiswa		Setiap siswa mendapat bimbingan dengan 1 pembimbing
nextOfKin	Penjelasan tentang keluarga terdekat mahasiswa		Setiap siswa mempunya informasi mengenai keluarga terdekat
lease	Penjelasan tentang penyewaan tempat tinggal mahasiswa		Setiap siswa dapat mengajukan request sewa tempat tinggal
invoice	Penjelasan tentang invoice dari penyeaan tempat tinggal mahasiswa		Setiap tempat tinggal yang ditempat mahasiswa akan mengenerate invoice
place	Penjelasan tentang tempat tinggal penyewaan mahasiswa		Penyewaan tempat tinggal menyediakan tempat (flat atau hall)
flat	Penjelasan tentang flat mahasiswa		Mahasiswa dapat memilih tempat tinggal (flat)
hall	Penjelasan tentang hall mahasiswa		Mahasiswa dapat memilih tempat tinggal (hall)
accomodationStaff	Penjelasan tentang staff yang bertanggung jawab	staff	Staff akomodasi mengelola hall dan menginspeksi flat

	dengan akomodasi mahasiswa		
inspection	Penjelasan tentang inspeksi flat mahasiswa		Beberapa staff melakukan inspeksi untuk flat

1.2 Identify relationship types

Entity	Multiplicity	Relationship	Multiplicity	Entity
student	1..1	request	0..*	lease
	1..1	has	0..1	nextOfKin
	1..1	attend	1..*	course
	1..1	responsibility	1..*	advisor
lease	1..1	generate	1..1	invoice
	1..1	provide	1..1	place
accomodationStaff	1..1	manage	1..1	hall
	1..1	undertakes	0..*	inspection
flat	1..1	inspected by	1..*	inspection

1.3 Identify and associate attributes with entity or relationship types

Entity	Attributes	Description	Type & Width	Null	Multi Values	Comp osite
student	student_no	Primary Key, mengidentifikasi setiap mahasiswa	Char(4)	No	No	No
	name (first_name, last_name)	Nama mahasiswa	Varchar(30)	No	No	Yes
	address (street, city, postcode)	Alamat mahasiswa	Varchar(100)	No	No	Yes
	date_of_birth	Tanggal lahir mahasiswa	Date	No	No	No
	sex	Jenis kelamin mahasiswa	Char(1)	No	No	No
	category	Kategori mahasiswa	Varchar(20)	No	No	No
	nationality	Kewarganegaraan mahasiswa	Varchar(30)	No	No	No
	smooker	Mahasiswa perokok	Char(3)	No	No	No
	special_need	Mahasiswa yan memiliki kebutuhan khusus	Varchar(100)	Yes	No	No
	comment	Komen	Varchar(100)	Yes	No	No
	current_status	Status tempat tinggal mahasiswa	Varchar(20)	No	No	No
advisor	advisor_no	Primary Key, mengidentifikasi setiap	Char(4)	No	No	No

		pembimbing				
	name (first_name, last_name)	Nama pembimbing	Varchar(30)	No	No	Yes
	position	Posisi pembimbing	Varchar(20)	No	No	No
	department	Department pembimbing	Varchar(20)	No	No	No
	internal_tlp_no	No tlp pembimbing	Integer(13)	No	No	No
	room_no	No ruangan pembimbing				
course	course_no	Primary Key, mengidentifikasi setiap mata kuliah	Char(4)	No	No	No
	course_title	Nama mata kuliah	Varchar(30)	No	No	No
	course_lead	Penanggung jawab mata kuliah	Varchar(30)	No	No	No
	internal_tlp_no	No tlp penanggung jawab mata kuliah	Integer(13)	No	No	No
	room_no	No ruangan mata kuliah	Char(4)	No	No	No
	department	Department mata kuliah	Varchar(20)	No	No	No
nextOfKin	student_no	Primary Key, mengidentifikasi setiap mahasiswa	Char(4)	No	No	No
	name	Nama keluarga terdekat	Varchar(30)	No	No	Yes
	relationship	Hubungan keluarga terdekat dengan mahasiswa	Varchar(30)	No	No	No
	address (street, city, postcode)	Alamat keluarga terdekat	Varchar(100)	No	No	Yes
	tlp_no	No tlp keluarga terdekat	Integer(13)	No	No	No
lease	lease_no	Primary Key, mengidentifikasi setiap lease	Char(4)	No	No	No
	student_no	Foreign Key untuk menghubungkan dengan entity mahasiswa	Char(4)	No	No	No
	duration	Durasi sewa tempat tinggal				
	place_no	Foreign Key untuk menghubungkan dengan entity place	Char(4)	No	No	No
	enter_date	Tanggal masuk	Date	No	No	No
	leave_date	Tanggal keluar	Date	No	No	No
invoice	invoice_no	Primary Key, mengidentifikasi setiap invoice	Char(4)	No	No	No

	lease_no	Foreign Key untuk menghubungkan dengan entity lease	Char(4)	No	No	No
	student_no	Foreign Key untuk menghubungkan dengan entity mahasiswa	Char(4)	No	No	No
	semester	Invoice semester	Varchar(30)	No	No	No
	payment_due	Tanggal jatuh tempo	Date	No	No	No
	date_paid	Tanggal pembayaran	Date	No	No	No
	payment_method	Metode pembayaran	Varchar(20)	No	No	No
	reminder1	Peringatan pembayaran pertama	Date	No	No	No
	reminder2	Peringatan pembayaran kedua	Date	No	No	No
place	place_no	Primary Key, mengidentifikasi setiap place	Char(4)	No	No	No
	room_no	Foreign Key untuk menghubungkan dengan entity flat & hall	Char(4)	No	No	No
	monthly_rate		Integer(20)	No	No	No
hall	hall_no	Primary Key, mengidentifikasi setiap hall	Char(4)	No	No	No
	name_hall	Nama hall	Varchar(30)	No	No	No
	address (street, city, postcode)	Alamat hall	Varchar(100)	No	No	Yes
	tlp_no	No tlp hall	Integer(13)	No	No	No
	hall_manager	Nama manager hall	Char(4)	No	No	No
flat	flat_no	Primary Key, mengidentifikasi setiap flat	Char(4)	No	No	No
	address (street, city, postcode)	Alamat flat	Varchar(100)	No	No	Yes
	number_single_of_bed	Jumlah tempat tidur dalam satu ruangan	Integer(1)	No	No	No
accomodationStaff	staff_no	Primary Key, mengidentifikasi setiap staff	Char(4)	No	No	No
	name (first_name, last_name)	Nama staff	Varchar(30)	No	No	Yes
	position	Jabatan staff	Varchar(30)	No	No	No

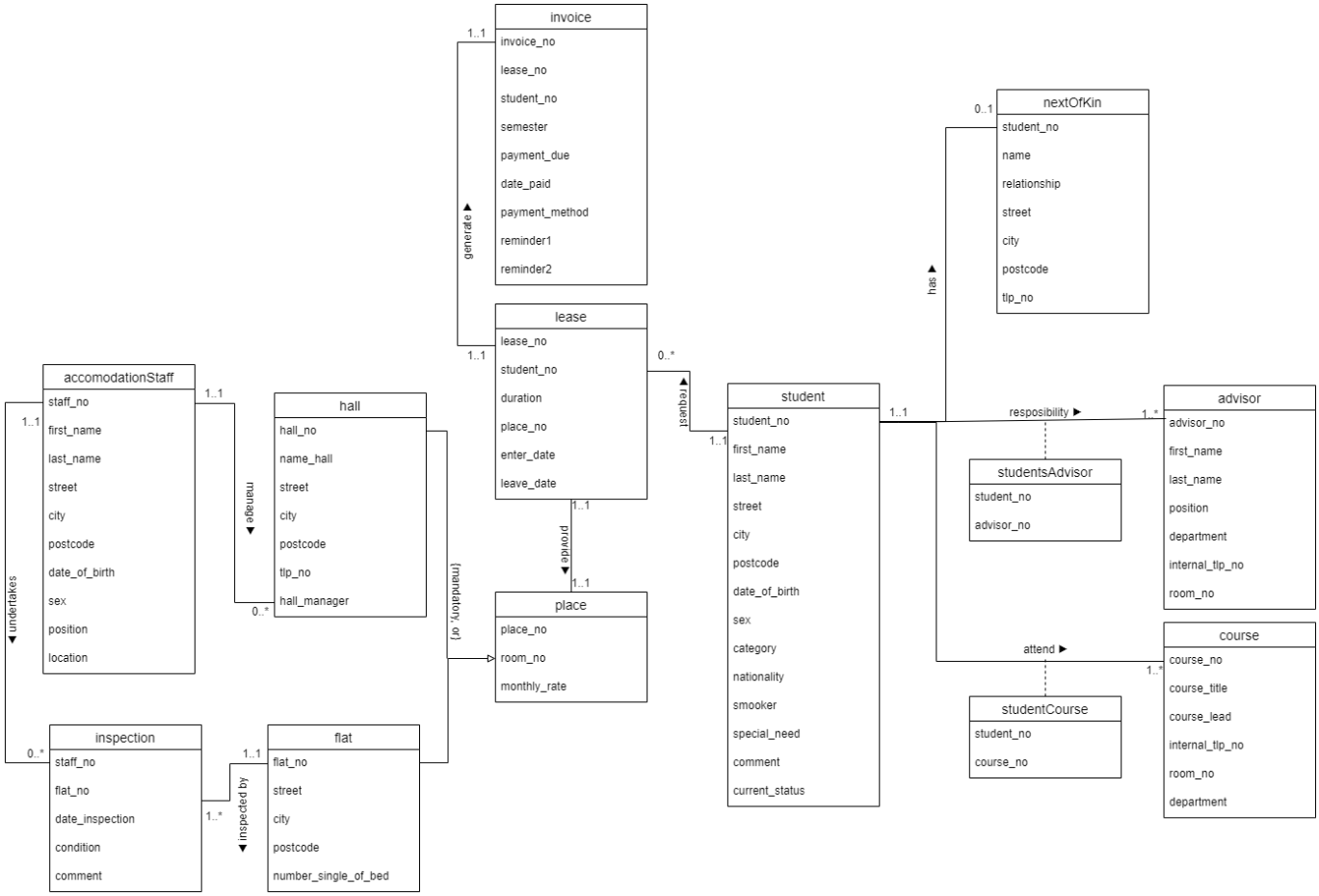
	address (street, city, postcode)	Alamat staff	Varchar(100)	No	No	Yes
	date_of_birth	Tanggal lahir staff	Date	No	No	No
	sex	Jenis kelamin staff	Char(1)	No	No	No
	location	Location penempatan staff	Varchar(30)	No	No	No
inspection	staff_no	Primary Key sekaligus Foreign Key untuk menghubungkan dengan entity staff	Char(4)	No	No	No
	flat_no	Primary Key sekaligus Foreign Key untuk menghubungkan dengan entity flat	Char(4)	No	No	No
	date_inspection	Primary Key, mengidentifikasi setiap tanggal inspeksi	Date	No	No	No
	satisfy	Rate hasil inspeksi	Varchar(3)	No	No	No
	comment	Komen inspeksi	Varchar(30)	Yes	No	No

1.4 Determine attribute domains

Entity	Attributes	Domain
student	sex	M or F
	category	undergraduate, postgraduate
	smoker	yes or no
	current_status	placed or waiting
invoice	payment_method	cheque, cash, visa, etc
accomodationStaff	position	Hall Manager, Administrative Assistant, Cleaner
	location	Accommodation Office or Hall
inspection	satisfy	yes or no

notes : untuk attributes yang tidak tercantum berarti tidak memiliki domain khusus

1.5 Determine candidate, primary, and alternate key attributes



Entity	Primary Key	Foreign Key
students	student_no	
advisor	advisor_no	
studentAdvisor	student_no	student_no references student(student_no) advisor_no references advisor(advisor_no)
hall	student_no	hall_manager references accomodationStaff(staff_no)
flat	flat_no	
place (table generalization)	place_no	room_no references hall(hall_no) room_no references flat(flat_no)
lease	lease_no	student_no references student(student_no) place_no references place(place_no)
invoice	invoice_no	lease_no references lease(lease_no) student_no references student(student_no)
inspection	staff_no, flat_no, date_inspection	staff_no references accommodationStaff(staff_no) flat_no references flat(flat_no)
accomodationStaff	staff_no	
course	course_no	
studentCourse	student_no	student_no references student(student_no) course_no references course(course_no)

nextOfKin	student_no	student_no references student(student_no)

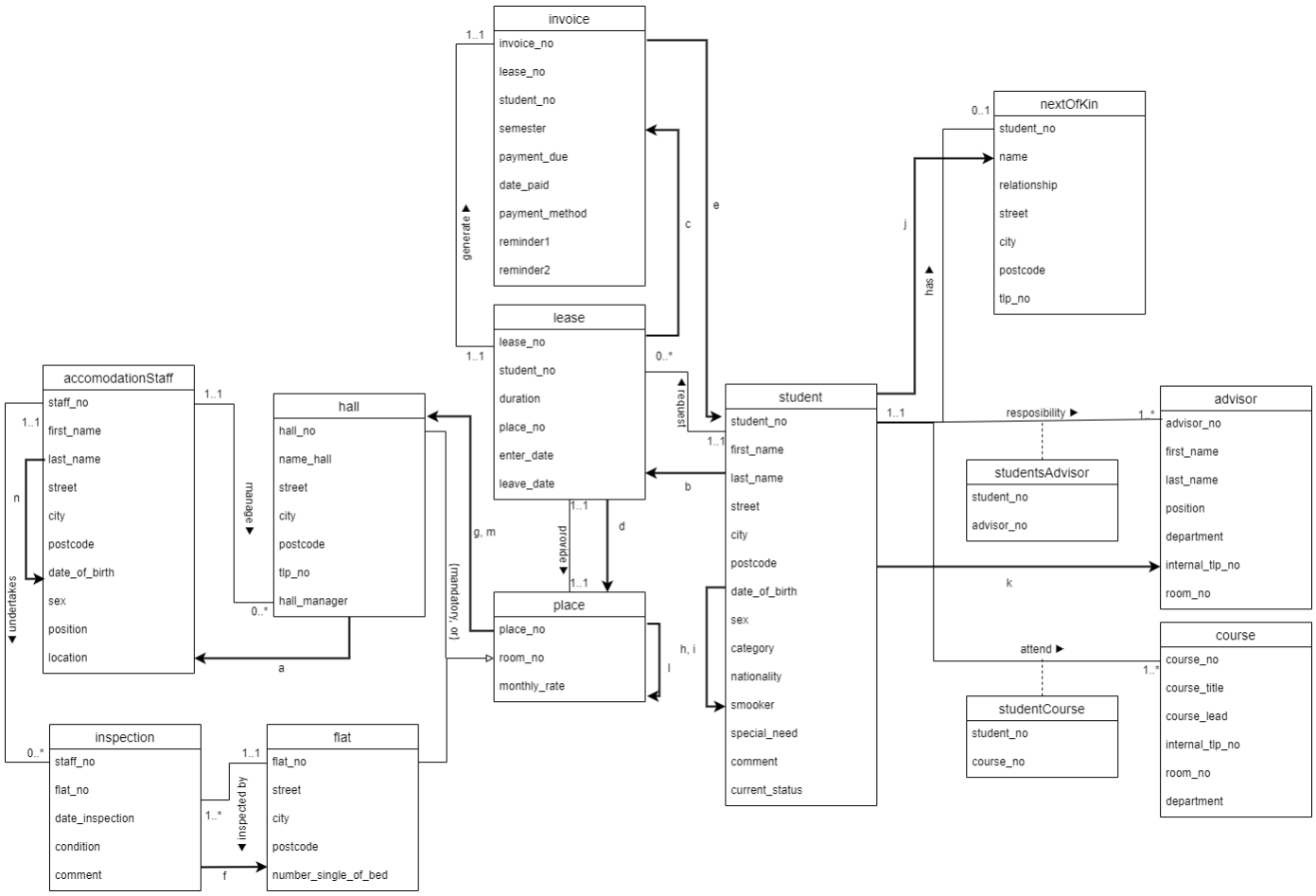
1.6 Consider use of enhanced modeling concepts (optional step)

Tidak diperlukan

1.7 Check model for redundancy

Tidak ada kerangkapan relationship

1.8 Validate conceptual model against user transactions



The University Accommodation Office Case Study

16.10 Create and validate a logical data model from the conceptual data model for the University Accommodation Office case study created in Exercise 15.16.

2.1 Derive relations for logical data model

2.1.1 Strong entity types

- student
- advisor
- studentAdvisor
- hall
- flat
- place (table generalization)
- lease
- invoice
- inspection
- accomodationStaff
- course
- studentCourse

2.1.2 Weak entity types

- nextOfKin

2.1.3 1:* binary relationship types

Entity	Multiplicity	Relationship	Multiplicity	Entity
student	1..1	request	0..*	lease
	1..1	attend	1..*	course
	1..1	responsibility	1..*	advisor
accomodationStaff	1..1	undertakes	0..*	inspection
flat	1..1	inspected by	1..*	inspection

2.1.4 1:1 binary relationship types

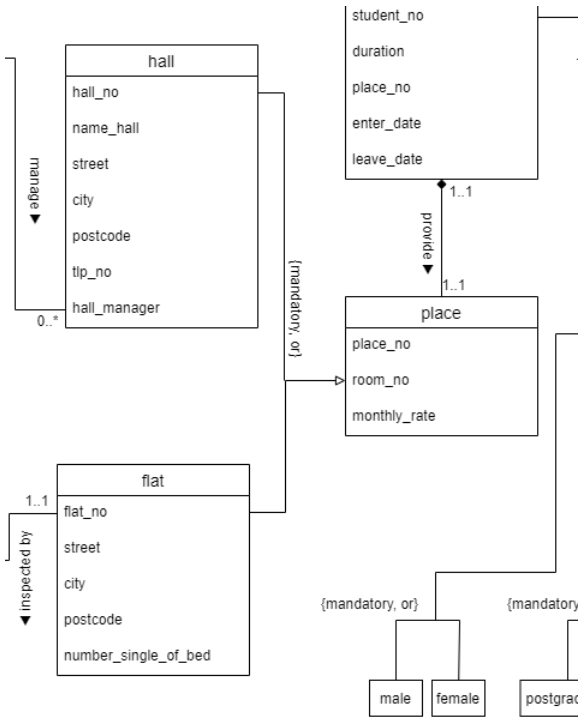
Entity	Multiplicity	Relationship	Multiplicity	Entity
student	1..1	has	0..1	nextOfKin
lease	1..1	generate	1..1	invoice
	1..1	provide	1..1	place
accomodationStaff	1..1	manage	1..1	hall

2.1.5 1:1 recursive relationships - follow rules for participation for a 1:1 relationship

Tidak ada

2.1.6 Superclass/subclass relationship types

Entity place adalah superclass, sedangkan hall & flat adalah subclass dari place

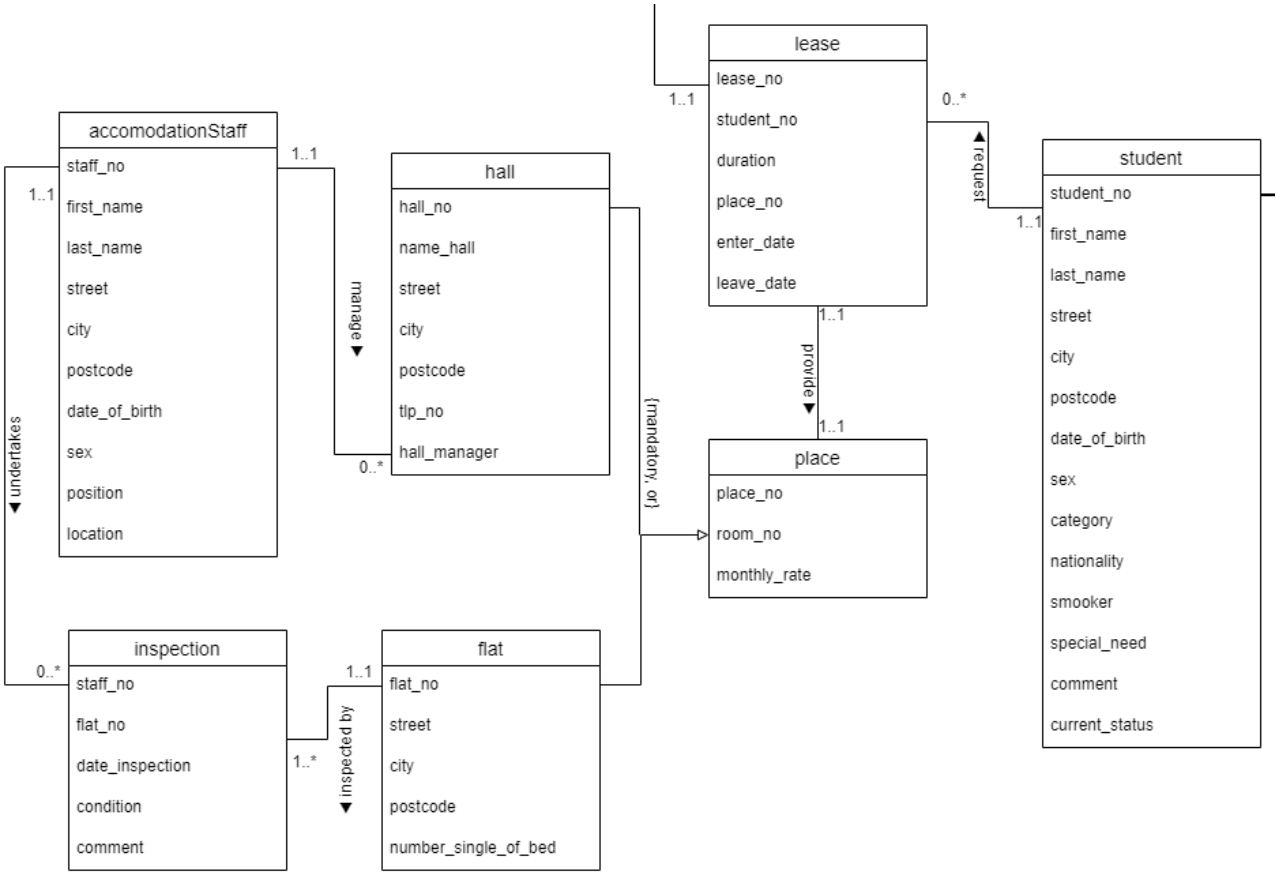


2.1.7 *:* binary relationship types

Tidak ada

2.1.8. Complex relationship types

student request lease → lease provide place (hall or flat) → flat inspected by inspection → accomdationStaff undertakes inspection and manage hall



2.1.9 Multi-valued attributes

name → firstName, lastName

address → street, city, postcode

2.2 Validate relations using normalization

Sudah dalam bentuk normal ke-3

2.3 Validate relations against user transaction

-

2.4 Check integrity constraints

Entity	Primary Key	Foreign Key
studentAdvisor	student_no	student_no references student(student_no) advisor_no references advisor(advisor_no)
hall	student_no	hall_manager references accomodationStaff(staff_no)
place (table generalization)	place_no	room_no references hall(hall_no) room_no references flat(flat_no)
lease	lease_no	student_no references student(student_no) place_no references place(place_no)
invoice	invoice_no	lease_no references lease(lease_no)

		student_no references student(student_no)
inspection	staff_no, flat_no, date_inspection	staff_no references accommodationStaff(staff_no) flat_no references flat(flat_no)
studentCourse	student_no	student_no references student(student_no) course_no references course(course_no)
nextOfKin	student_no	student_no references student(student_no)

2.5 Review logical data model with user