

PERMODELAN OBJEK

1. Pengertian Permodelan Objek

Pendekatan menggunakan permodelan objek sewaktu sistem analisis desain dipanggil analisis berorientasikan objek (OOA). Teknik **OOA** digunakan untuk (1) mengkaji objek yang ada dengan maksud untuk melihat apakah objek bisa digunakan/disesuaikan dengan penggunaan baru (2) mendefinisikan objek baru/yang disesuaikan untuk digabungkan dengan objek yang tersedia untuk aplikasi bisnis.

Permodelan Objek adalah suatu teknik mengetahui objek-objek dalam lingkungan sistem dan membuat hubungan di antara objek-objek tersebut. Objek adalah sesuatu yang bisa dilihat, disentuh atau diketahui dan sesuatu yang menyimpan data dan ciri-ciri yang berkaitan (oleh pengguna).

2. Konsep Sistem bagi Permodelan Objek

Objek

Jenis objek meliputi manusia, tempat, benda atau peristiwa.

- Contoh objek manusia: pekerja, pelanggan, vendor, pelajar.
- Contoh objek tempat: gudang, pejabat daerah, bangunan, bilik.
- Contoh objek benda: produk, kenderaan, peralatan, pita video.
- Contoh peristiwa: pesanan, permohonan, pendaftaran, tempahan.

Atribut :

Dalam orientasi objek istilah data merujuk kepada atribut yaitu data yang mewakili ciri-ciri objek.

Contoh atribut objek pelanggan : customer number, first name, last name, home address, work address, type of customer, home phone, work phone, credit limit, available credit, account balance.

Instance

Setiap objek pelanggan dirujuk sebagai instance objek yang terdiri dari nilai atribut yang menerangkan tentang individu, tempat, benda atau peristiwa tertentu.

“**Behavior**” objek.

Behavior merujuk kepada perkara-perkara yang bisa dilakukan oleh objek dan berkaitan dengan fungsi yang bertindak ke atas data objek (atribut). Dalam orientasi objek, behavior dikenali sebagai metode atau pelayanan. Objek bertujuan sepenuhnya melaksanakan fungsi/ciri-ciri yang bertindak ke atas datanya (atribut).

Contoh: only YOU (an object) may CHANGE (behavior) your LAST NAME and HOME ADDRESS (attributes about you).

Encapsulation

Encapsulation bermakna pengumpulan beberapa item ke dalam satu unit. Atribut dan behavior objek dikumpulkan bersama. Cara untuk mencapai atribut objek adalah melalui behavior objek. Satu Objek tidak boleh melaksanakan behavior objek lain.

Kelas

Kelas adalah satu set objek yang berbagi atribut dan behavior yang sama. Dirujuk juga sebagai kelas objek. Konsep mengategorikan objek mengikuti kelas.

Contoh: buku teks dan buku kerja mewakili benda – objek-objek yang mempunyai atribut dan behavior yang sama dan bisa dikelaskan sebagai BUKU.

Kelas bisa meliputi objek-objek subkelas.

Contoh: objek kelas PELAJAR dan GURU menjadi anggota kelas INDIVIDU.

Apabila peringkat kelas diketahui, konsep warisan (inheritance) digunakan. Inheritance yaitu metode dan/atau atribut didefinisikan dalam satu kelas objek dan bisa diwarisi serta digunakan lagi oleh kelas objek lain.

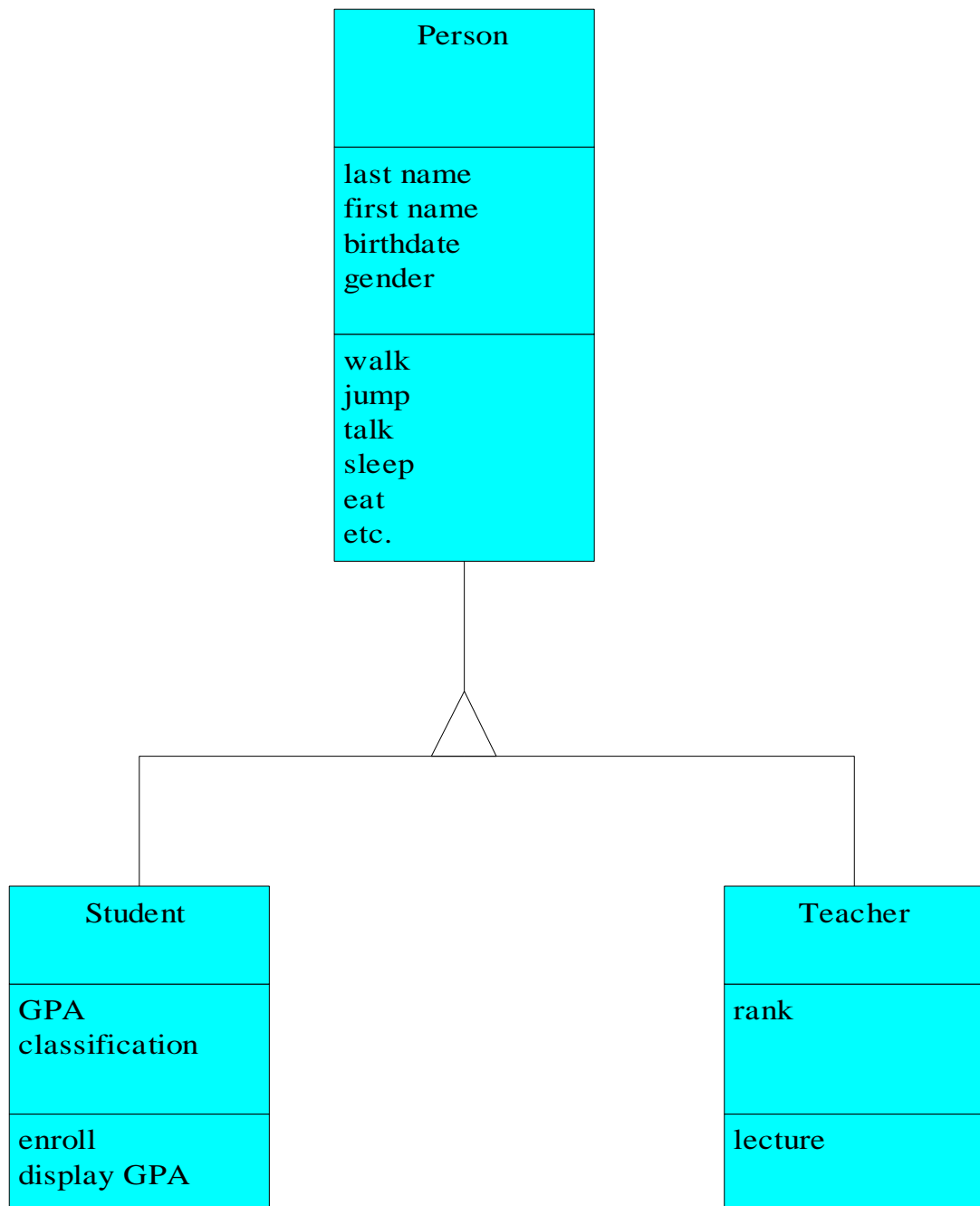
Generalisasi

Generalization/specialization suatu teknik di mana atribut dan behavior yang sama untuk beberapa kelas objek dikumpulkan dalam kelas mereka yang dipanggil superkelas. Atribut dan metode kelas objek superkelas diwarisi oleh objek-objek kelas tersebut. Dalam kelas objek PERSON, STUDENT dan TEACHER, PERSON dirujuk

sebagai *superkelas* (generalization class) dan STUDENT dan TEACHER dirujuk sebagai *subkelas* (specialization class).

Superkelas mempunyai satu atau lebih hubungan 1:1 dengan subkelas. Kelas diwakili sebagai segiempat bagi model objek dalam Aliran Kelas. Segiempat terbagi ke dalam tiga bagian, yaitu:

- Bagian atas - nama kelas.
- Bagian tengah - urutan nama atribut yang sama.
- Bagian bawah - urutan (method) yang sama.



Gambar 1: Supertype and subtype relationships between object classes

Hubungan Objek/Kelas

Objek dan kelas tidak bisa dipisahkan karena keduanya memiliki hubungan bisnis yang ada di antara satu atau lebih objek/kelas.

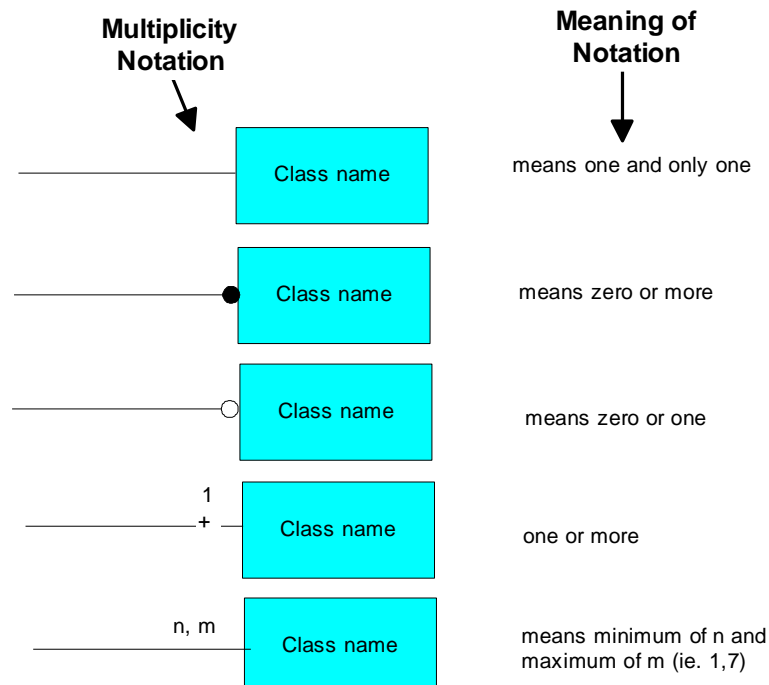
Contoh: objek kelas pelanggan dan pesanan.

- a CUSTOMER PLACES zero or more ORDERs
- an ORDER IS PLACED BY one and only one CUSTOMERs

Biasanya hubungan di antara 2 kelas diwakili oleh garis penghubung dan semua hubungan adalah 2 arah. Multiplicity mendefinisikan bilangan min dan max occurrence untuk satu objek/kelas dengan satu occurrence objek/kelas yang berkaitan.



(a)



(b)

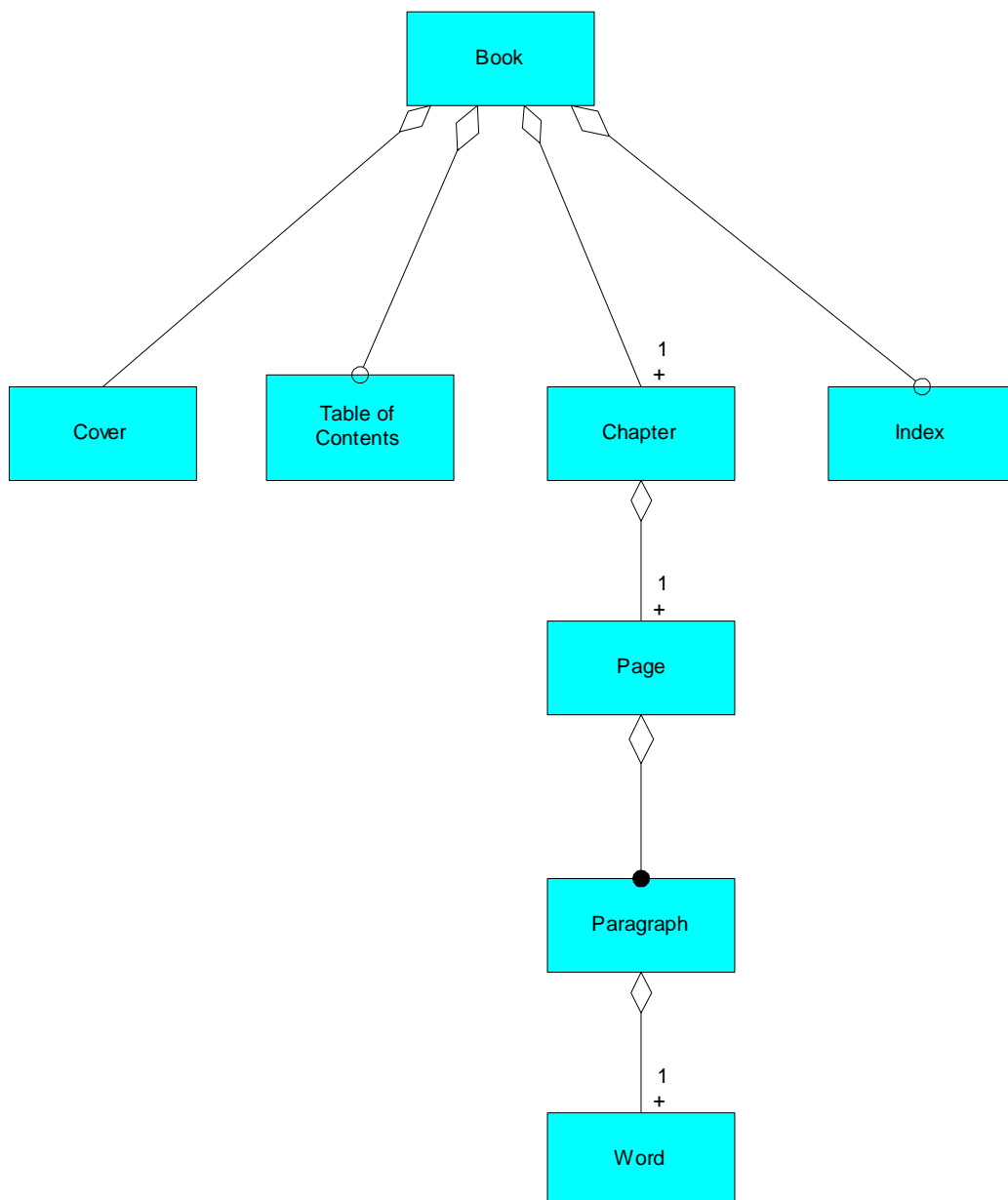
Gambar 2 : Object/Class Relationships and Multiplicity Nations

Kadang-kadang objek/kelas dibuat dari objek/kelas lain. Hubungan ini dipanggil pengagregatan (*aggregate*).

Misalnya: TEXTBOOK object may contain several objects, including: COVER, TABLE OF CONTENTS, CHAPTER, and INDEX objects.

- The CHAPTER object contains PAGE objects, which in turn contain PARAGRAPH objects, which in turn contain WORD objects, and so forth.

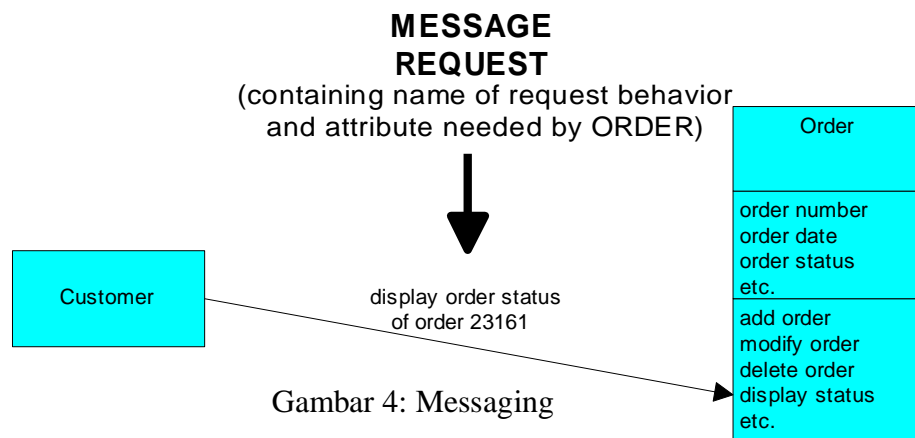
Pengagregatan membolehkan kita memecahkan objek yang sangat kompleks.



Gambar 3 : Aggregate Relationships

Pesan dan Penghantaran Pesan

Objek/Kelas berinteraksi di antara satu sama lain dengan menghantar pesan. Pesan dihantar apabila satu objek meminta informasi/tindakan dari metode objek lain.



Polymorphism

Polymorphism : “banyak bentuk” di dalam orientasi objek bermakna satu behavior boisa dilaksanakan berlainan untuk objek/kelas yg berlainan. Objek yang meminta untuk mengetahui tentang pelayanan (behavior) yang diinginkannya dan dari objek yang mana semua itu bisa diperoleh.

3. Proses Permodelan Objek

Analisis Berorientasikan Objek (OOA) bertujuan untuk memahami sistem dan spesifikasi fungsian dengan lebih baik. OOA memerlukan kita mengetahui objek, atribut data, behavior yang berkaitan dan hubungan yang menunjang fungsian sistem bisnes. Permodelan Objek dibuat untuk mendokumentasikan objek, data dan behavior yang berkenaan serta hubungan di antara objek. Terdapat dua aktivitas umum dari OOA, yaitu:

- Mencari dan mengetahui objek bisnes.
- Mengelola objek-objek dan mengetahui hubungan di antara keduanya.

3.1 Mencari dan mengetahui objek bisnes

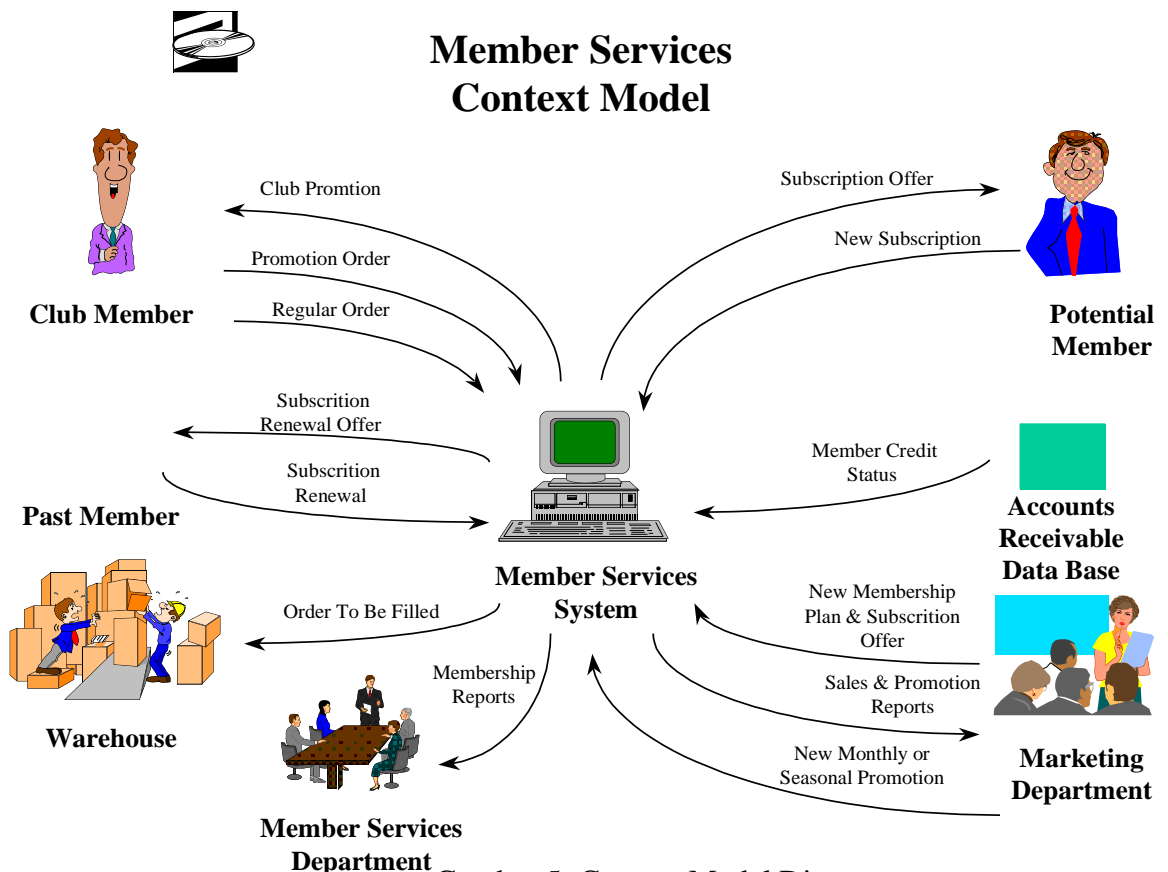
Kebanyakan metodologi menyarankan pencarian melalui dokumen melalui katanama. Masalah yang akan timbul adalah terlalu banyak katanama dalam sebuah dokumen. Teknik untuk pencarian adalah *Use Case Modeling* yaitu proses mengetahui dan memodelkan peristiwa bisnes, siapa yang mencetusnya dan bagaimana sistem berhubungan dengannya. Teknik ini membagikan ruang lingkup fungsian sistem

keseluruhan kepada pernyataan fungsian sistem yang lebih kecil yang dipanggil kasus-kasus penggunaan atau peristiwa bisnis. Kasus penggunaan adalah langkah-langkah(kenario) yang berhubungan diantara manual dan berkomputer untuk melaksanakan satu tugas bisnis. Format yg lebih kecil ini memudahkan teknik mencari kata nama. Kasus penggunaan mengetahui dan menerangkan fungsi sistem dari perspektif pengguna luaran.

Kasus penggunaan dipelopori oleh pengguna atau sistem yang dipanggil *actor* yaitu sesuatu yang mewakili apa yang berinteraksi dengan sistem untuk bertukar informasi. Actor adalah pengguna, peranan yang bisa terdiri dari sistem luaran atau individu. Bagi peristiwa yang dicetuskan oleh waktu, actor merupakan sistem itu sendiri. Langkah-langkah dalam mencari dan mengetahui objek bisnis, yaitu:

Langkah 1: Mengetahui Actor dan Kasus Penggunaan, yaitu dengan menganalisis aliran konteks sistem.

- Jika entiti luaran mencetus input, anggaplah entiti tersebut sebagai actor.
- Sahkan hasil analisis dengan bagian analisa bisnis.



Gambar 5: Context Model Diagram

ACTOR		USE CASE
Club Member	<i>initiates</i>	Submit Promotion Order Submit Regular Order
Potential Member	<i>initiates</i>	Submit New Subscription
Past Member	<i>initiates</i>	Submit Subscription Renewal
Member Services Department	<i>initiates</i>	Request Membership Rpts.
Marketing Department	<i>initiates</i>	Create New Monthly Promotion Create New Seasonal Promotion Create New Subscription Program Request Promotion Rpts. Request Sales Rpts.
Member Services System	<i>initiates</i>	Send New Subscription Offer Send Club Promotion Send Subscription Renewal Offer

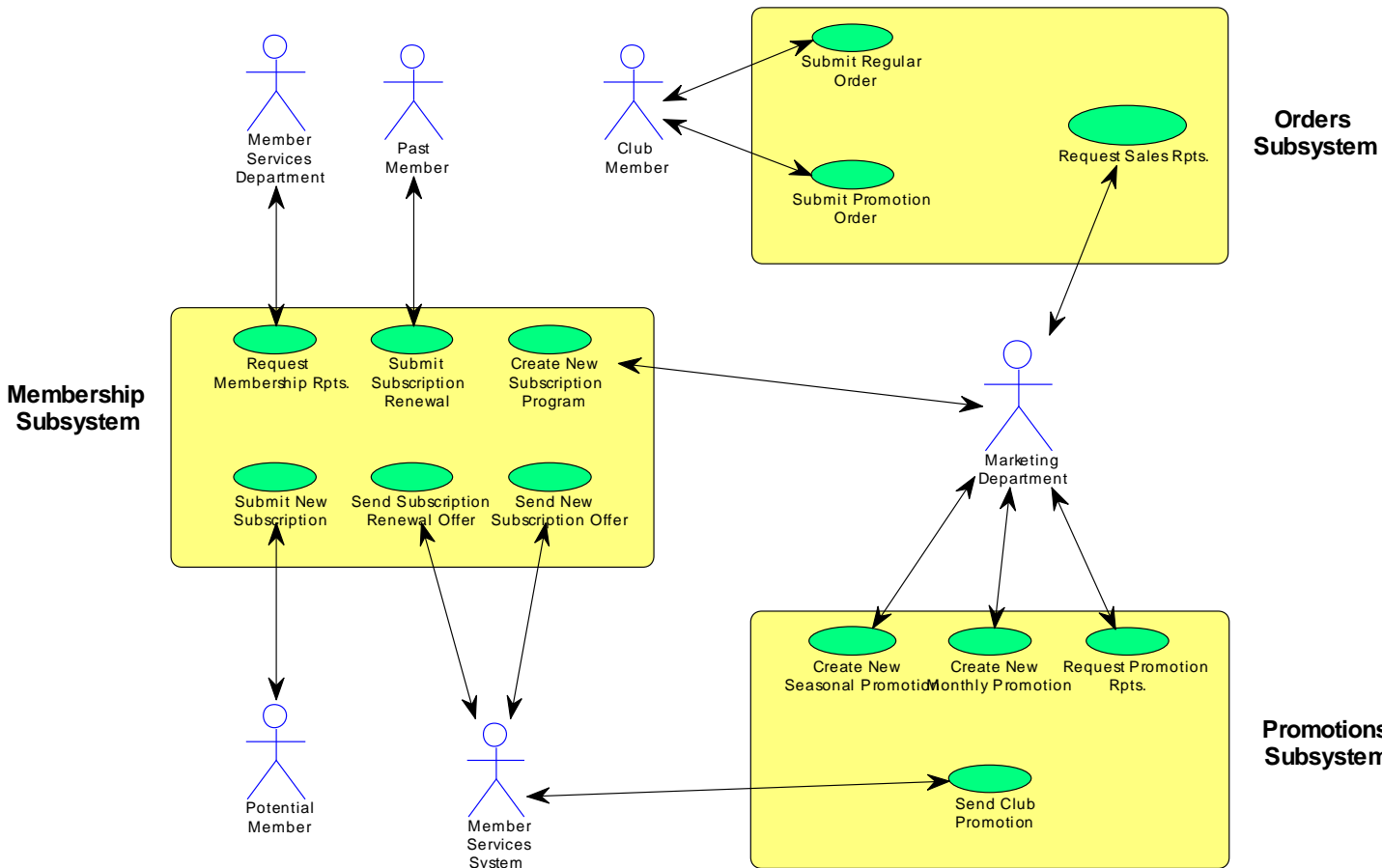
Tabel 1: Listing of Actors and Use Cases

Langkah 2: Buat Use Case Model

Use Case Model Diagram digunakan untuk menggambarkan ruang lingkup dan batasan sistem dari aspek kasus penggunaan dan actors. *Use Case Model Diagram* menunjukkan hubungan di antara actor dan kasus penggunaan yang didefinisikan dalam setiap subsistem bisnis, yaitu:

- Subsistem mewakili kontrol fungsian bagi proses bisnis.
- Pembahagian sistem kepada subsistem penting dlm memahami arsitektur sistem dan penting dalam mendefinisikan strategi pembangunan – prioritas kasus penggunaan dan pembangunnya.

Member Services System Use Case Model



Gambar 5: Use Case Model Diagram

Langkah 3: Mendokumentasikan Peristiwa Kasus Kegunaan

Penerangan langkah demi langkah yang dimulai dengan actor yang memulakan kasus kegunaan sehingga peristiwa bisnes berakhir.

- Masukkan langkah-langkah utama yang biasanya berlaku.
- Kasus-kasus khas didokumentasikan kemudian.

USE CASE

Author: L. Bentley

Date: 10/01/96

USE CASE NAME:	Submit Promotion Order
ACTOR:	Club Member
DESCRIPTION:	Describes the process when a club member submits a club promotion order to either indicate the products they are interested in ordering or declining to order during this promotion.
NORMAL COURSE:	<ol style="list-style-type: none"> 1. This use case is initiated when the club member submits the promotion order to be processed. 2. The club member's personal information such as address is validated against what is currently recorded in member services. 3. The promotion order is verified to see if product is being ordered. 4. The club member's credit status is checked with Accounts Receivable to make sure no payments are outstanding. 5. For each product being ordered, validate the product number. 6. For each product being ordered, check the availability in inventory and record the ordered product information which include "quantify being ordered" and give each ordered product a status of "open". 7. Create a Picking Ticket for the promotion order containing all ordered products which have a status "open". 8. Route the Picking Ticket to the Warehouse.
PRE-CONDITION:	Use case <i>Send Club Motion</i> has been processed.
POST-CONDITION:	Promotion order has been recorded and the Picking Ticket has been routed to the Warehouse.
ASSUMPTIONS:	

Tabel 2 : A Sample Use Case Description

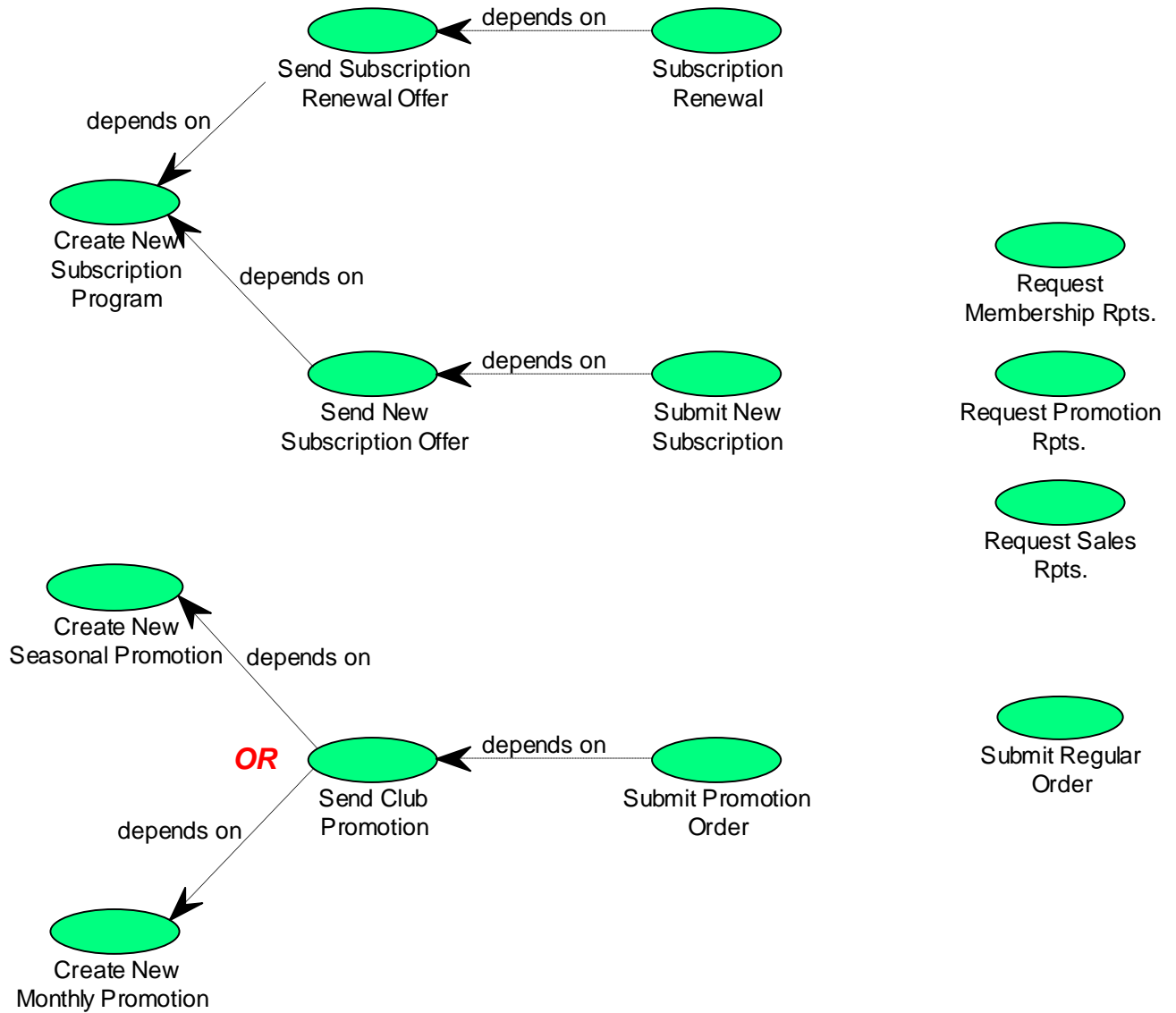
Langkah 4: Ketahui ketergantungan kasus kegunaan.

Ada kasus kegunaan yang bergantung kepada kasus kegunaan lain yang melahirkan prasyarat. Ketergantungan dimodelkan melalui Use Case Dependency Diagram.

Keuntungan Use Case Dependency Diagram, diantaranya:

- Gambaran grafik peristiwa sistem meningkatkan kefahaman tentang fungsian sistem.
- Mengetahui kasus kegunaan yang tertinggal - prasyarat.
- Memudahkan pengelolaan projek - menunjukkan kasus yang kritikal (yang mempunyai paling banyak ketergantungan) - prioritas tinggi.

Member Services System Use Case Dependency Diagram



Gambar 6: Use Case Dependency Diagram

Langkah 5 : Mendokumentasikan peristiwa pilihan kasus kegunaan (kasus biasa atau pilihan)

USE CASE

Author: **L. Bentley**

Date: **10/02/96**

USE CASE NAME:	Submit Promotion Order
ACTOR:	Club Member
DESCRIPTION:	Describes the process when a club member submits a club promotion order to either indicate the products they are interested in ordering or declining to order during this promotion.
NORMAL COURSE:	<ol style="list-style-type: none"> 1. This use case is initiated when the club member submits the promotion order to be processed. 2. The club member's personal information such as address is validated against what is currently recorded in member services. 3. The promotion order is verified to see if product is being ordered. 4. The club member's credit status is checked with Accounts Receivable to make sure no payments are outstanding. 5. For each product being ordered, validate the product number. 6. For each product being ordered, check the availability in inventory and record the ordered product information which include "quantify being ordered" and give each ordered product a status of "open". 7. Create a Picking Ticket for the promotion order containing all ordered products which have a status "open". 8. Route the Picking Ticket to the Warehouse.
ALTERNATE COURSE:	<ol style="list-style-type: none"> 2. If the club member has indicated an address or telephone number change on the promotion order, update the club member's record with the new information. 3. If the club member is not ordering product at this time, modify the promotion order's status to be "closed" and modify the selection of the month ordered product's record to have a status of "rejected", then cancel the transaction. 4. If Accounts Receivable returns a credit status that the customer is in arrears, invoke abstract use case <i>Send Order Rejection Notice</i>. Modify the promotion order's status to be "on hold pending payment". 5a. If the product number is not valid, create an Order Error Report containing the club member's information, the promotion order information and the product number in error. Each completed report will be routed to a Member Services clerk for resolution. 5b. If the club member is not ordering the selection of the month, modify the ordered product's record to have a status of "rejected". 6. If the product being ordered is not available, record the ordered product information which include "quantify being ordered" and give a status of "backordered". 7. If there are no ordered product records with a status of "open", cancel the transaction.
PRE-CONDITION:	Use case <i>Send Club Motion</i> has been processed.
POST-CONDITION:	Promotion order has been recorded and the Picking Ticket has been routed to the Warehouse.
ASSUMPTIONS:	

Tabel 3: Sample Use Case Description with Alternate Courses

Langkah 6: Mencari objek yg berpotensi.

Meneliti setiap kasus kegunaan untuk mencari kata nama yang berhubungan dengan entiti/peristiwa bisnis.

Langkah 7: Memilih objek yg disarankan

Pilih kata nama yang mewakili objek bisnis yang baik dan buang kata nama yang mewakili:

- Synonyms
- Kata nama di luar ruang lingkup sistem
- Peranan tanpa behavior unik atau peranan luaran
- Kata nama yang tidak jelas
- Kata nama yang merupakan tindakan atau atribut

POTENTIAL OBJECT LIST
Club Member
Potential Member
Past Member
Member Services Department
Marketing Department
Member Services System
Member Address
Promotion order
Product
Product Inventory
Order Quantity
Ordered Product
Credit Status
Payments
Ordered Product Status
Picking Ticket
Warehouse
Member Telephone Number
Selection Of Month
Transaction
Accounts Receivable
Promotion Order Status
Order Error Report
Member Services Clerk

Tabel 4: Potential Object List

PROPOSED OBJECT LIST
MEMBER
MEMBER ORDER
PRODUCT
PRODUCT ON ORDER
TITLE
PROMOTION
<i>PLUS</i>
MERCHANDISE
AUDIO TITLE
VIDEO TITLE
GAME TITLE
CLUB
CLUB MEMBERSHIP
AGREEMENT

Tabel 5: Proposed Object List

USE CASE

Author: **L. Bentley**

Date: **10/05/96**

USE CASE NAME:	Submit Promotion Order
ACTOR:	Club Member
DESCRIPTION:	Describes the process when a club member submits a promotion order to either indicate the products they are interested in ordering or declining to order during this promotion .
NORMAL COURSE:	<ol style="list-style-type: none"> 1. This use case is initiated when the club member submits the promotion order to be processed. 2. The club member's personal information such as address is validated against what is currently recorded in member services. 3. The promotion order is verified to see if product is being ordered. 4. The club member's credit status is checked with Accounts Receivable to make sure no payments are outstanding. 5. For each product being ordered, validate the product number. 6. For each product being ordered, check the availability in inventory and record the ordered product information which include "quantify being ordered", and give each ordered product a status of "open". 7. Create a Picking Ticket for the promotion order containing all ordered products which have a status "open". 8. Route the Picking Ticket to the Warehouse.
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PRE-CONDITION:	Use case Send Club Motion has been processed.
POST-CONDITION:	Promotion order has been recorded and the Picking Ticket has been routed to the Warehouse.
ASSUMPTIONS:	

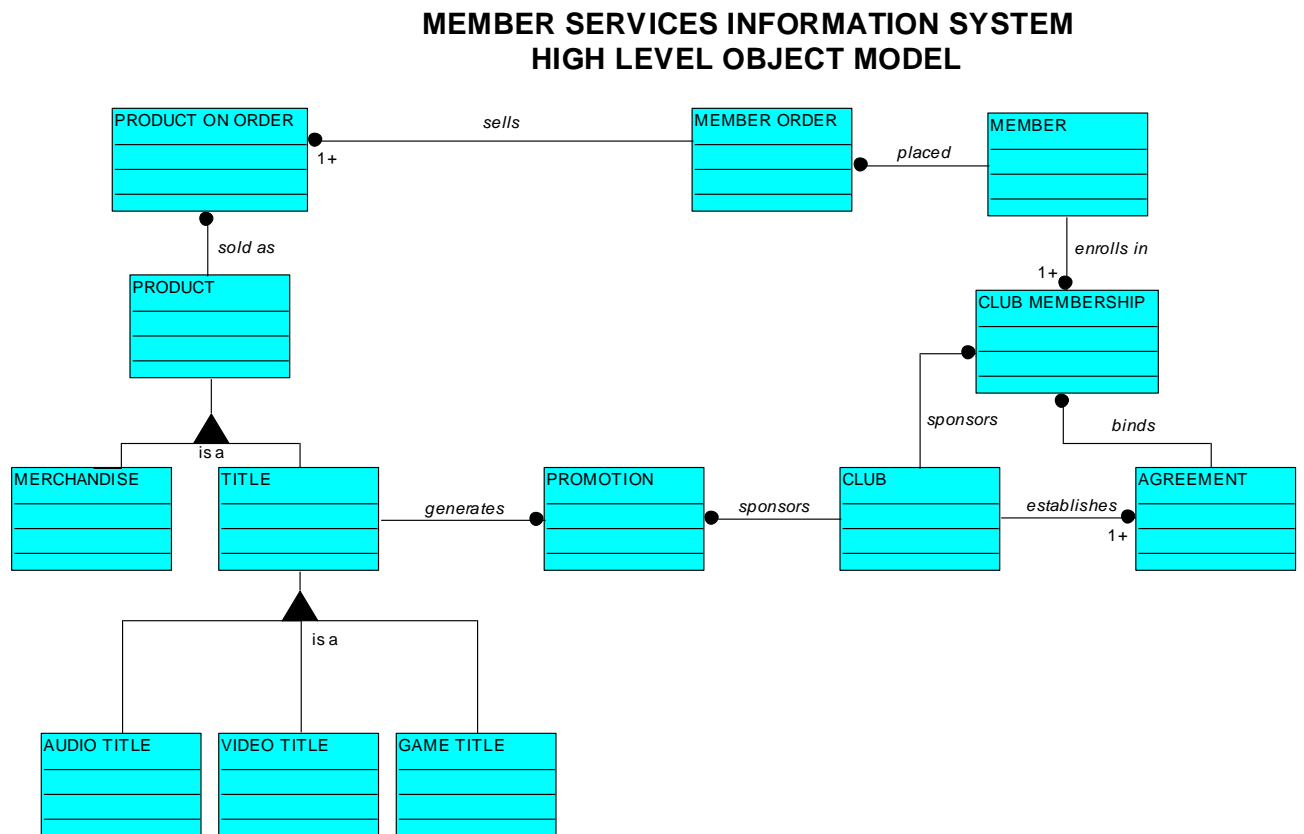
Tabel 6: Use Case with Nouns Highlighted

POTENTIAL OBJECT LIST		REASON
Club Member	✓	Type of "MEMBER"
Potential Member	✓	Type of "MEMBER"
Past Member	✓	Type of "MEMBER"
Member Services Department	∞	Not relevant for current project
Marketing Department	∞	Not relevant for current project
Member Services System	∞	Not relevant for current project
Member Address	∞	Attribute of "MEMBER"
Promotion order	✓	Result of an event named "PROMOTION"
	✓	Type of "MEMBER ORDER"
Product	✓	"PRODUCT"
Product Inventory	∞	Attribute of "PRODUCT"
Order Quantity	∞	Attribute of "MEMBER ORDER"
Ordered Product	✓	"PRODUCT ON ORDER"
Credit Status	∞	Attribute of "MEMBER"
Payment	∞	Out of Scope
Ordered Product Status	∞	Attribute of "PRODUCT ON ORDER"
Picking Ticket	∞	Potential interface item
Warehouse	∞	Not relevant for current project
Member Telephone Number	∞	Attribute of "MEMBER"
Selection Of Month	✓	Type of "TITLE"
Transaction	∞	Not relevant for current project
Accounts Receivable	∞	Not relevant for current project
Promotion Order Status	∞	Attribute of "MEMBER ORDER"
Order Error Report	∞	Potential interface item
Member Services Clerk	∞	Not relevant for current project

Tabel 7: Analyzing The Potential Object List

3.2 Menyusun Objek dan Mengetahui Hubungannya

Model Hubungan Objek (OAM) digunakan untuk menunjukkan objek dan hubungannya. Alirannya meliputi: *multiplicity*, *generalization/ specialization relationships*, *aggregation relationships*.



Gambar 7: Model Hubungan Objek