Indian Institute of Technology, Madras
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CS6852: Assignment 2 - Ontology Design

Group - 16

Domain - ECommerce

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Class Description :

Concept Name	Description
Person	An individual who can be either male or female and has a name.
Customer	A person who has bought a product, reviews products, places an order, cancels an order, and can be either a prime or non-prime customer.
InternationalCustomers	Customers who have a country other than India.
DomesticCustomers	Customers who have India as their country.
Vendor	A person who has a rating and sells a product.
Product	A physical or digital item that can be sold by a vendor and belongs to a brand. It can have a name, type, discount, and coupon.
Brand	A company that has a product.
BestSellerProducts	Products that have been ordered more than 100 times by customers.

Concept Name	Description
OfferedProducts	Products that are sold by vendors and have discounts provided by vendors.
PrimeOfferedProducts	Offer products that are sold to prime customers.
DeliveryAgent	A person who delivers orders and delivers shipping information.
Shippinginfo	Information that consists of either an address or billing information.
Order	An entity that consists of a delivery agent, a customer, products, shipping information, order status, and shipping options.
OrderStatus	An entity that consists of processing status, shipped status, delivered status, cancelled status, or returned status.
PendingStatus	A status that is pending.
ProcessingStatus	A status that is processing.
ShippedStatus	A status that is shipped.

Concept Name	Description
DeliveredStatus	A status that is delivered.
CanceledStatus	A status that is cancelled.
PaymentMethod	A payment method that can be either credit card, PayPal, or bank transfer.
CreditCardMethod	A payment method that is a credit card.
PayPalMethod	A payment method that is PayPal.
BankTransferMethod	A payment method that is bank transfer.
BillingInformation	An entity that consists of either credit card information, PayPal information, or bank transfer information.
ShippingOption	An entity that consists of either standard shipping, express shipping, or same-day delivery.
StandardShipping	A shipping option that is standard shipping.

Concept Name	Description
ExpressShipping	A shipping option that is express shipping.
SameDayDelivery	A shipping option that is same-day delivery.

Property Description :

Role	Description
hasName	Relates a Person or Customer to their name.
placesOrder	Relates a Customer to a Order they have placed.
cancelsOrder	Relates a Customer to a Order they have cancelled.
Reviews	Relates a Customer to a Product they have reviewed.
Rates	Relates a Customer to a Vendor they have rated.

Role	Description
hasSold	Relates a Product to the Vendor who sold it.
hasCountry	Relates a Customer to the country they are from.
hasRating	Relates a Vendor or Product to a rating given by a Customer.
sells	Relates a Vendor to a Product they sell.
soldBy	Relates a Product to the Vendor who sells it.
hasType	Relates a Product to its type.
belongsTo	Relates a Product to the Brand it belongs to.
hasProduct	Relates a Brand to a Product it has.
orderedBy	Relates a Product to the Customer who ordered it.
discountProvidedBy	Relates a Product to the Vendor who provides a discount for it.

Role	Description
soldto	Relates a Product to the Customer who bought it.
Delivers	Relates a DeliveryAgent to an Order they delivered.
Deliversto	Relates a DeliveryAgent to a ShippingInfo they delivered to.
deliveredBy	Relates an Order to the DeliveryAgent who delivered it.
contains	Relates an Order to a Product it contains.
hasShippingInfo	Relates an Order to the ShippingInfo it has.
hasOrderStatus	Relates an Order to the OrderStatus it has.
hasShippingOption	Relates an Order to the ShippingOption it has.
appliesTo	Relates a Discount to the Product it applies to.
hasAmount	Relates a Discount to the amount it provides (either as a percentage or a fixed value).

Role	Description
hasCode	Relates a Coupon to its unique code.

TBox (Terminology Component) :

- Person ≡ (Male ⊔ Female) ⊓ (∃hasName.Name)
- Customer ≡ Person ⊓ (∃placesOrder.Order ⊔ ∃cancelsOrder.Order ⊔ ∃reviews.Product)
- Customer ⊑ PrimeCustomers ⊔ NonPrimeCustomers
- InternationalCustomers ≡ Customer ⊓ hasCountry.¬{India}
- DomesticCustomers ≡ Customer ⊓ hasCountry.{India}
- Customer ⊑ InternationalCustomers ⊔ DomesticCustomers
- Vendor ≡ Person ⊓ (∃sells.Product)
- Vendor ⊑ ∃hasRating.Rating
- Product ≡ PhysicalProduct ⊔ DigitalProduct
- Product ⊑ ∃hasName.Name ⊓ ∃hasType.Type ⊓ ∃Soldby.Vendor ⊓ ∃belongsTo.Brand
- Product ⊑ ¬ Customers
- Brand ⊑ ∃hasProduct.Product
- Product ⊑ (∀ hasRating.Rating ⊓ (≥0 hasRating.Value) ⊓ (≤5 hasRating.Value))
- BestSellerProducts ≡ Products ⊓ >100 ∃Orderedby.Customer
- OfferedProducts ⊑ ∃discountprovidedby.Vendor ⊓ ∃soldby.Vendor
- PrimeOfferedProducts ⊑ OfferedProducts ⊓ ∃soldto.PrimeCustomers
- PrimeCustomers ≡ Customer ⊓ ∃hasSubscription.PrimeSubscription
- PrimeOfferedProducts ⊑ OfferedProducts
- DeliveryAgent ⊑ ∃Delivers.Orders ⊓ ∃Deliversto.ShippingInfo
- DeliveryAgent ⊑ Person
- Shippinginfo ⊑ Address ⊔ BillingInformation

- Order ≡ ∃deliverdBy.DeliveryAgent ⊓ ∃orderedBy.Customer ⊓ ∃contains.Product ⊓ ∃hasShippingInfo.ShippingInfo ⊓ ∃hasOrderStatus.OrderStatus ⊓ ∃hasShippingOption.ShippingOption ⊓ ∃hasPaymentMethod .PaymentMethod

- OrderStatus ≡ ProcessingStatus ⊔ ShippedStatus ⊔ DeliveredStatus ⊔ CanceledStatus ⊔ ReturnedStatus

- PendingStatus ⊑ OrderStatus

- ProcessingStatus ⊑ OrderStatus

- ShippedStatus ⊑ OrderStatus

- DeliveredStatus ⊑ OrderStatus

- CanceledStatus ⊑ OrderStatus

- PaymentMethod ≡ CreditCardMethod ⊔ PayPalMethod ⊔ BankTransferMethod

- CreditCardMethod ⊑ PaymentMethod

- PayPalMethod ⊑ PaymentMethod

- BankTransferMethod ⊑ PaymentMethod

- BillingInformation ≡ CreditCardInformation ⊔ PayPalInformation ⊔ BankTransferInformation

- ShippingOption ≡ StandardShipping ⊔ ExpressShipping ⊔ SameDayDelivery

- StandardShipping ⊑ ShippingOption

- ExpressShipping ⊑ ShippingOption

- SameDayDelivery ⊑ ShippingOption

ABox (Assertion Component) :

- Suresh: Person

- Amay: Person

- Deven: Person

- Gopal: Person

- Raj : Person

- Pooja: Female

- Anaya: Female

- Saurav: Male

- Sandesh: Male

- Raj : Male
- Suresh: Customer
- Amay: Customer
- Gopal: Customer
- Sandesh: Customer
- Saurav: Customer
- Raj : DeliveryAgent
- iphone : Product
- iphone : Order
- PrimeMart : Vendor
- (Amay, iphone): placeOrder
- (Deven, macbook): placeOrder
- (Anaya, Dress): placeOrder
- (Anaya, Dress): hasRating
- (Amay, iphone): hasRating
- (Deven , Macbook): hasRating
- (Deven, Macbook): cancelsOrder
- (Anaya, India): hasCountry
- (Pooja, India): hasCountry
- (Gopal, India): hasCountry
- (Deven, USA): hasCountry
- Anaya : DomesticCustomers
- Pooja : DomesticCustomers
- Deven : InternationalCustomers
- (Gopal, Laptop): contains
- (Gopal, Laptop): hasOrderStatus
- (Gopal, Laptop): hasShippingInfo
- (Gopal, Laptop): hasShippingOption
- (Gopal, Laptop): hasPaymentMethod
- (Gopal, Laptop): hasBillingInfo
- Dress : Physical_Product
- MS_Office : DigitalProduct
- Lenovo: Brand

- HP : Brand
- Apple: Brand
- H&M : brand
- (iphone,Apple): belongsTo
- (macbook, Apple): belongsTo
- (Laptop, HP) : belongsTo
- (Jeans, H&M): belongsTo
- platinum: PrimeSubscription
- (Deven, platinum): hasSubscription
- Deven : PrimeCustomers
- Macbook: PrimeOfferedProducts
- "Adyar Chennai": Shipping_Info
- (Pooja, "Adyar Chennai"): hasAddress
- (Raj, "Adyar Chennai"): DeliversTo
- (macbook, CanceledStatus): OrderStatus
- (iphone, Shipped) : OrderStatus
- (Dress,PrimeMart): soldBy
- Pooja : Dress
- Gopal : DomesticCustomers
- Anaya : Dress

Situation/Example :

- Deven, who is an international customer, ordered a Macbook then cancelled and returned it.
- Gopal, who bought a laptop has OrderStatus, ShippingInfo and BillingInfo information.
- Amay, who bought an Iphone, posted a customer review.
- Dress, which is a physical product, was sold by vendor prime mart.
- Anaya, who is a domestic customer, ordered a physical product named Dress and posted a customer review.
- Deven, who is a prime customer, owns a prime subscription called platinum subscription.

- Raj, who is a delivery agent, received an order to deliver with the address "Adyar Chennai".
- Pooja, who is a domestic customer, ordered a physical product named Dress with shipping address as "Adyar Chennai".
- Anaya, who is a domestic customer, ordered a physical product named Dress that belongs to brand H&M.
- Deven, who is a prime customer, ordered a prime offered product Macbook and then cancelled it.