Problem Set 7

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Part 1

15.3.2

$B(S)\frac{(M-1+B(R))}{M-1} = 10000 * \frac{1000-1+10000}{1000-1} = 110100.$

15.3.3

a)$B(S)\frac{M-1+B(R)}{M-1} \leq 100000$, So $M \geq 1112.1 \geq 1113$.

c)$B(S)\frac{M-1+B(R)}{M-1} \leq 15000$, So $M \geq 20001$.

15.4.2

a) Make sure $\sqrt{B(R)+B(S)} = 141 < 1000$. $3(B(R)+B(S)) = 3 * (10000+10000) = 60000$

b) Make sure $\sqrt{max(B(R),B(S))} = 100 < 1000$. $5(B(R)+B(S)) = 5 * (10000+10000) = 100000$

16.2.2

a) Let R(a,b) consist of (1,1) and S(a,b) consist of (1,2), $\pi_a(R \cup_S S) = \pi_a\{(1,1),(1,2)\} = \{1,1\}$. $\pi_a(R) \cup_S \pi_a(S) = \{1\}$. They are not equal.

c) Let R(a,b) be $\{(1,1),(1,2)\}$, $\delta(\pi_a(R)) = \{1\}$. $\pi_a(\delta(R)) = \{1,1\}$. They are not equal.

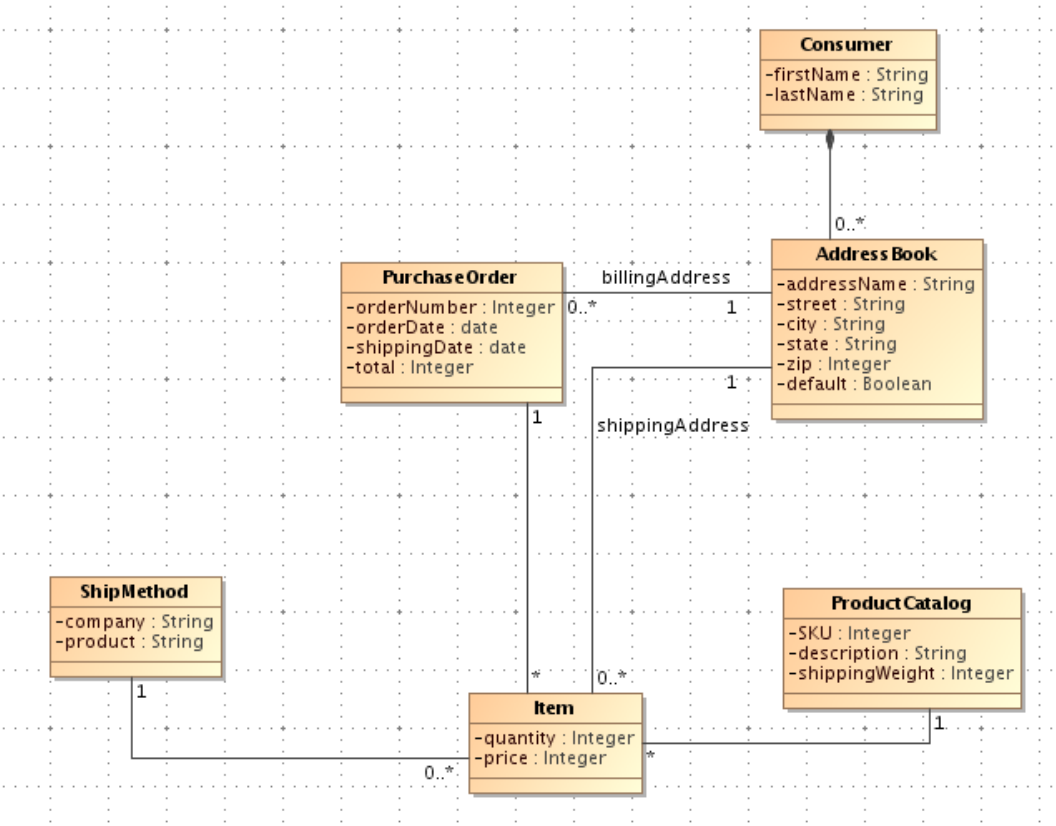
16.2.6

a) $\pi_{b+c\to x,c+d\to y}(\pi_{b,c}R(a,b,c) \bowtie \pi_{b,c,d}S(b,c,d,e))$

b) $\pi_{a,b,a+d\to z}(R(a,b,c) \bowtie \pi_{b,c,d}S(b,c,d,e))$

Part 2

1)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-lastName : String
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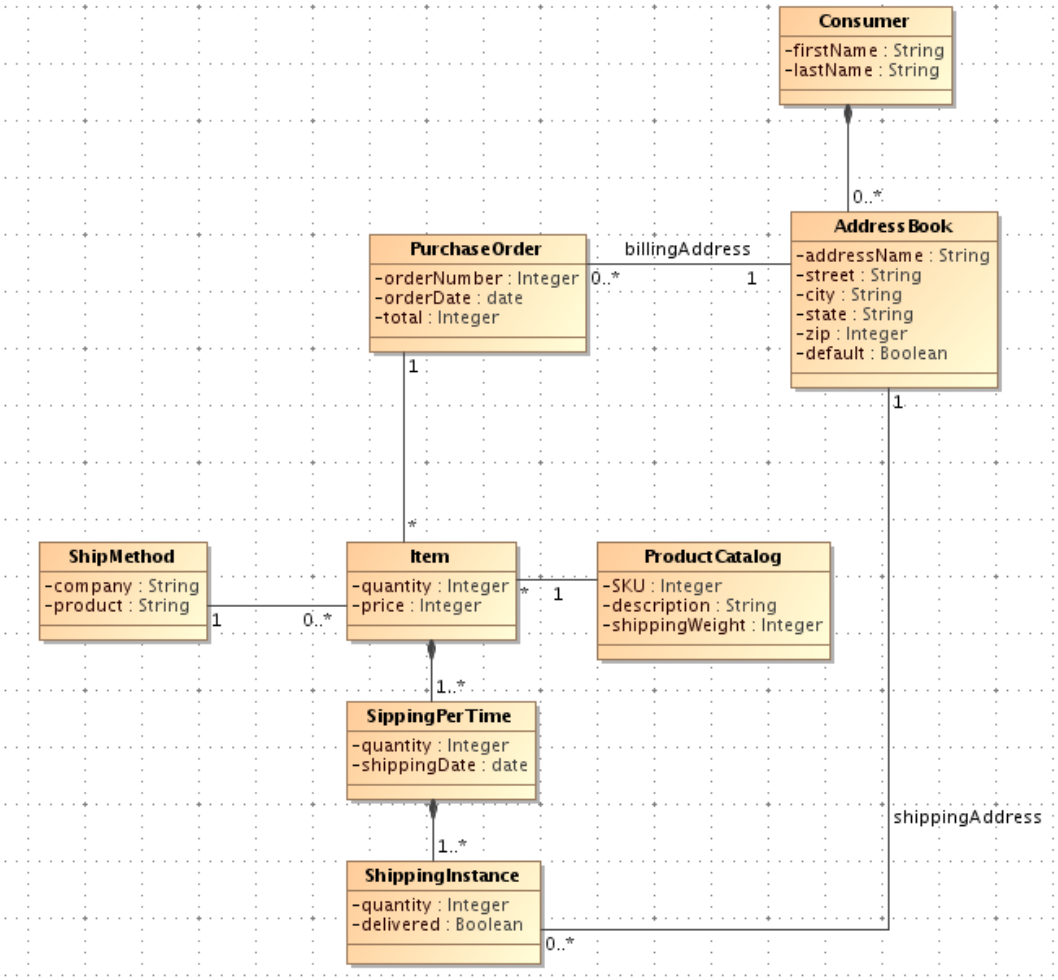
Address Book
-addressName : String
-street : String
-city : String
-state : String
-zip : Integer
-default : Boolean
billingAddress
0..*
1
1
shippingAddress
PurchaseOrder
-orderNumber : Integer
-orderDate : date
-shippingDate : date
-total : Integer
1
ShipMethod
-company : String
-product : String
1
0..*
*
0..*
Item
-quantity : Integer
-price : Integer
*
ProductCatalog
-SKU : Integer
-description : String
-shippingWeight : Integer
1

2)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-product : String
1
0..*
Item
-quantity : Integer
-price : Integer
*
1
ProductCatalog
-SKU : Integer
-description : String
-shippingWeight : Integer
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SippingPerTime
-quantity : Integer
-shippingDate : date
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ShippingInstance
-quantity : Integer
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