

### **publishers**

Let A = fname  
Let B = lname  
Let C = email  
Let D = phoneNums  
Let E = bankNum

Relation(A, B, C, D, E)

Functional dependency = (

$C \rightarrow ABDE$

$E \rightarrow ABCD$

)

Since C determines all other attributes, and e determines all other attributes, this dependency does not violate BCNF and therefore this relation is in BCNF

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### **PhoneNumbers**

Let A = publisherEmail  
Let B = phoneNumber

Relation(A, B)

Functional dependency = (

$AB \rightarrow AB$

)

Since AB determines all other attributes, this dependency does not violate BCNF and therefore this relation is in BCNF

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### **books**

Let A = genres  
Let B = ISBN  
Let C = name  
Let D = pages  
Let E = price  
Let F = quantity  
Let G = publisherSharePercentage  
Let H = publisherEmail

Relation(A, B, C, D, E, F, G, H)

Functional Dependency = (

$B \rightarrow ACDEFGH$   
)

Since B determines all other attributes, this dependency does not violate BCNF and therefore this relation is in BCNF

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### **Genres**

Let A = BookISBN

Let B = Genre

Relation(A, B)

Functional dependency = (  
 $A \rightarrow B$   
)

Since A determines all other attributes, this dependency does not violate BCNF and therefore this relation is in BCNF

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### **booksHasAuthor**

Let A = AuthorUID

Let B = BookISBN

Relation(A, B)

Functional dependency = (  
 $AB \rightarrow AB$   
)

Since AB determines all other attributes, this dependency does not violate BCNF and therefore this relation is in BCNF

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### **authors**

Let A = UID

Let B = fname

Let C = name

Relation(A, B, C)

Functional Dependency = (  
 $A \rightarrow BC$   
)

Since A determines all other attributes, this dependency does not violate BCNF and therefore this relation is in BCNF

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### **OrderBooks**

Let A = bookISBN  
Let B = orderNum  
Let C = pricePerUnit  
Let D = quantity

Relation(A, B, C, D)

Functional dependency = (  
     $AB \rightarrow CD$   
)

Since AB determines all other attributes, this dependency does not violate BCNF and therefore this relation is in BCNF

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### **orders**

Let A = orderNum  
Let B = dateOrdered  
Let C = trackingNum  
Let D = paymentNum  
Let E = paymentExpiry  
Let F = payment3digitCode  
Let G = paymentFName  
Let H = paymentLName  
Let I = paymentStreetNum  
Let J = paymentStreet  
Let K = paymentCity  
Let L = paymentPostalCode  
Let M = paymentCountry  
Let N = shipStreetNum  
Let O = shipStreet  
Let P = shipCity  
Let Q = shipPostalCode  
Let R = shipCountry

Relation(A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R)

Functional Dependency = (  
     $A \rightarrow BCDEFGHIJKLMNOPQR$   
     $C \rightarrow ABDEFGHIJKLMNOPQR$   
)

Since A determines all other attributes, and C can determine all other attributes, this dependency does not violate BCNF and therefore this relation is in BCNF

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#### **ordersHasUser**

Let A = orderNum

Let B = userID

Relation(A, B)

Functional dependency = (  
     $AB \rightarrow AB$   
)

Since AB determines all other attributes, this dependency does not violate BCNF and therefore this relation is in BCNF

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#### **Users**

Let A = UID

Let B = fname

Let C = name

Relation(A, B, C)

Functional dependency = (  
     $A \rightarrow BC$   
)

Since A determines all other attributes, this dependency does not violate BCNF and therefore this relation is in BCNF

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#### **userHasAddress**

Let A = addressUID

Let B = userID

Relation(A, B)

Functional dependency = (  
     $A \rightarrow B$   
)

Since A determines all other attributes, this dependency does not violate BCNF and therefore this relation is in BCNF

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### **userHasPaymentCards**

Let A = paymentCardNum

Let B = userID

Relation(A, B)

Functional dependency = (  
     $A \rightarrow B$   
)

Since A determines all other attributes, this dependency does not violate BCNF and therefore this relation is in BCNF

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### **Addresses**

Let A = UID

Let B = streetNum

Let C = street

Let D = city

Let E = postalCode

Let F = country

Let G = type

Let H = name

Relation(A, B, C, D, E, F, G, H)

Functional dependency = (  
     $A \rightarrow BCDEFGH$   
)

Since A determines all other attributes, this dependency does not violate BCNF and therefore this relation is in BCNF

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### **paymentCards**

Let A = num

Let B = expiry

Let C = 3digitCode

Let D = fname

Let E = lname

Relation(A, B, C, D, E)

Functional dependency = (  
     $A \rightarrow BCDE$   
)

Since A determines all other attributes, this dependency does not violate BCNF and therefore this relation is in BCNF