Project Step 7: Executive Summary, Outline, Schema, Screenshots

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Executive Summary

Feedback

Initially, we received a fair amount of feedback regarding relationships, specifically between our Purchases and Items (our M:M relationship). Although we determined we did not need to make changes, the feedback was helpful for our conceptual understanding. We received a comment from Jennifer about an arrow in the ERD and from Kai-Hsiang on one typo in the ERD/schema, which were both helpful. In the second and third rounds of feedback, we received comments about whether our project required a distinct page to display our intermediate Purchases_Items table. We discussed this at length and determined it was not actually mandated by the project requirements, as the Guide only requires that "*Every table should be used in at least one SELECT query*"*,* which happens when updates and deletes are initiated on Purchases. Also, this exact scenario is set out in the discussion in Ed #503. Some feedback in step 3 suggested we needed to make a nullable relationship clear, which was correct (ee_id is nullable in Purchases) and recommended some additional aesthetic changes to the UI. As we approached the latter submission changes, we were pleased to receive mostly aesthetic and basic functional feedback. In stages 4 and beyond, we received feedback about whether Joins were supported, the timing of and implementation for other features like deletion (though we met all implementation deadlines). The second-to-last round of feedback helped with some minor parts of the UI implementation. The final round of peer feedback suggested validation on the credit card expiration in Purchases, which was not particularly helpful because the current design was a deliberate decision and it does incorporate needed validation.

Changes

We implemented a number of changes based on feedback, but elected to forego changes in some other circumstances. The changes that most impacted our overall database design were driven by internal debate rather than external feedback. In step 3, we transitioned to camelCase for attribute names, as we thought it would help when building the back end, especially translating GET and POST requests to SQL queries. During Step 4, we also implemented material changes to the functionality. Initially, we intended to implement DELETE functionality on every entity in the database. But, during development, we realized this would be problematic due to the foreign key constraints and it would be less logical for a company's records. The Employees entity was given additional attributes to represent if they were a current or former employee. We also made ee_id a nullable relationship in Purchases to meet project requirements. In steps 5 and 6, we implemented DELETE only for Purchases with a cascading functionality that deleted all relevant purchaseItems and restored inventoryQuantities where appropriate. UPDATE also underwent significant upgrades to ensure that changes to orders added/subtracted from the inventoryOnHand attribute as appropriate. Ultimately, we were very satisfied that the project met or exceeded all project specifications.

a.) Project Outline and Database Outline, ERD and Schema Updated Version

a.1 Overview

Three Eight Cycles is a retail store that sells $5 million in road bicycles, mountain bicycles, accessories, and apparel annually. Sales of Items are made both within a single physical store in an online storefront. Employees create individual sales and are rewarded based upon sales volume each quarter and annually. Growth and budget forecasts for upcoming years will be made based upon sales and inventory data supplied by the database. A database-driven website will record:

- **Customers** - both prospective Customers and Customers who have made at least one Purchase
- **Purchases** - of Items for sale within store to a Customer
- **PurchaseItems** - individual Items that are included within a Purchase by Customers
- **Items** - merchandise, e.g., bicycles, bicycle parts, accessories, and cycling apparel for sale within the store
- **Employees** - persons employed by the store to create and complete Purchases of Items for Customers

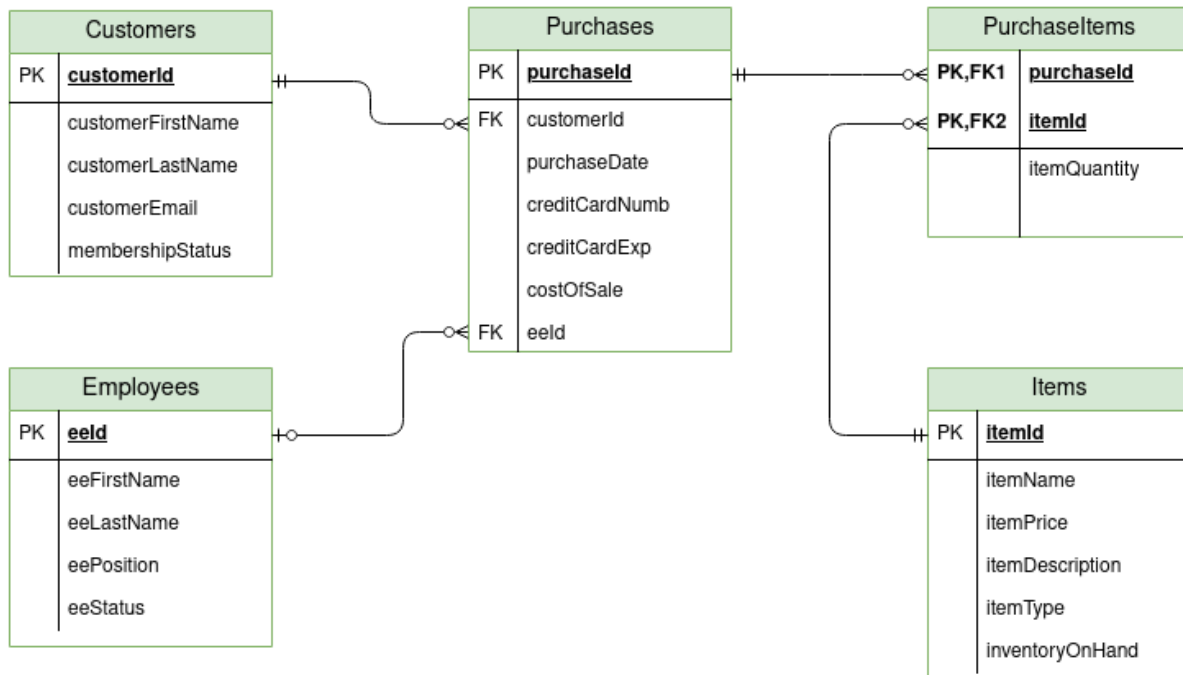## b.2 Database Outline, in Words

Specific information on each database entity includes:

1. **Customers** - records information about each customer who has purchased Items as a part of a Purchase() or prospective customer (for marketing purposes).
   a. customerId: int, auto_increment, unique, not NULL, PK
   b. customerFirstName : varchar (35), not NULL
   c. customerLastName: varchar(35), not NULL
   d. customerEmail: varchar(254) null OKAY
   e. membershipStatus: Boolean not Null
   f. Relationship: 1:M Relationship with Purchases implemented with customer_id as FK in Purchases
2. **Purchases** - records in-person and online sales PurchaseItems to Customers.
   a. purchaseId: auto_increment, unique, not NULL, PK
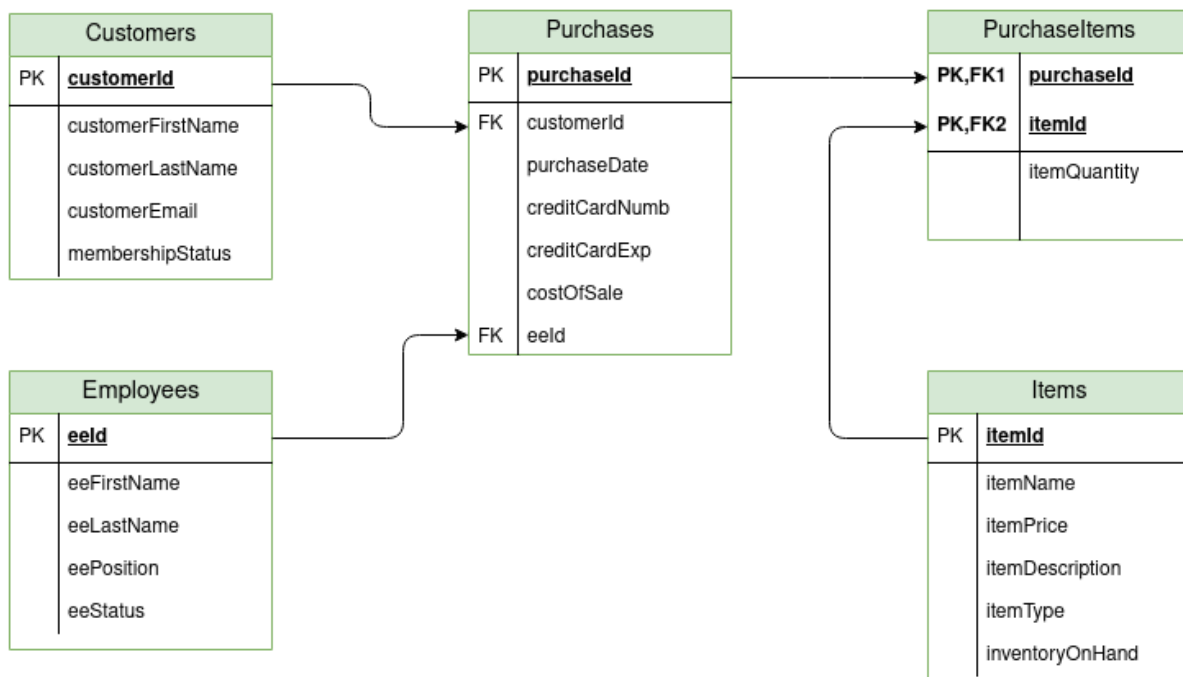   b. customerId: see in Customers, FK, not NULL
   c. purchaseDate: date, not NULL

      d. creditCardNumb: varchar (19) not NULL

      e. creditCardExp: varchar (4) not NULL

      f. costOfSale: decimal (size, 2) not NULL

      g. eeId: see eeId in Employees, FK, Null OKAY

      h. Relationships:

          i. M:1 relationship with Customers implemented with customer_id as FK in Purchases.

          ii. 1:M with PurchaseItems, implemented with purchase_id + item_id as PK in PurchaseItems.

          iii. M:1 with Employees implemented with ee_id as FK in Purchases

          iv. M:M with Items implemented via intermediate relationship with PurchaseItems

3. **PurchaseItems** - composite entity representing one item on one Purchase.

      a. purchaseId: see purchase_id in Purchase(s), FK not NULL

      b. itemId: see item_id in Items, FK, Not NULL

      c. itemQuantity: int, not NULL

      d. Relationships:

          i. M:1 with Purchases & M:1 with Items implemented using the FK's purchaseId+item_id as concatenated PK.

          ii. Intermediate in M:M relationship between Purchases and Items.

4. **Items** - records the available inventory of bicycles, bicycle parts, accessories, and cycling apparel for sale within the store.

      a. itemId: int, not NULL, unique, PK

      b. ItemName: varchar (35), not NULL

      c. itemPrice: decimal(size,2) , not NULL

      d. itemDescription: varchar (254), not NULL

      e. itemType: varchar (15), not NULL

      f. inventoryOnHand: int, not NULL

      g. Relationship:

          i. 1:M relationship with PurchaseItems implemented with item_id as FK in PurchaseItems

          ii. M:M with Purchases implemented via intermediate relationship with Purchase_items

5. **Employees** - records information about current Employees of Three Eight Cycles and their sales of Items as a part of Purchases.

    a. eeId: auto_incr, not NULL, unique, PK

    b. eeFirstName: varchar (35), not NULL

    c. eeLastName: varchar (35), not NULL

    d. eePosition: varchar (35) , not NULL

    e. eeStatus: Boolean not NULL

    f. Relationship: 1:M with Purchases implemented by using eeId as FK in Purchases.
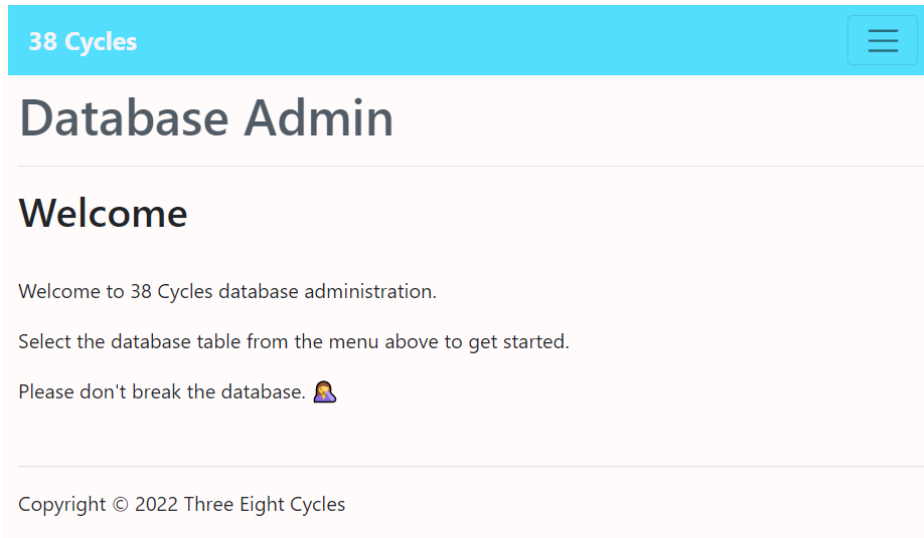
c) Entity-Relationship Diagram:

Customers

PK	customerId
	customerFirstName
	customerLastName
	customerEmail
	membershipStatus

Purchases

PK	purchaseId
FK	customerId
	purchaseDate
	creditCardNumb
	creditCardExp
	costOfSale
FK	eeId

PurchaseItems

PK,FK1	purchaseId
PK,FK2	itemId
	itemQuantity

Employees

PK	eeId
	eeFirstName
	eeLastName
	eePosition
	eeStatus

Items

PK	itemId
	itemName
	itemPrice
	itemDescription
	itemType
	inventoryOnHand

d) Schema

Customers

PK	customerId
	customerFirstName
	customerLastName
	customerEmail
	membershipStatus

Purchases

PK	purchaseId
FK	customerId
	purchaseDate
	creditCardNumb
	creditCardExp
	costOfSale
FK	eeId

PurchaseItems

PK,FK1	purchaseId
PK,FK2	itemId
	itemQuantity

Employees

PK	eeId
	eeFirstName
	eeLastName
	eePosition
	eeStatus

Items

PK	itemId
	itemName
	itemPrice
	itemDescription
	itemType
	inventoryOnHand

d) Screenshots

1) Home Page

38 Cycles ☰

Database Admin

Welcome
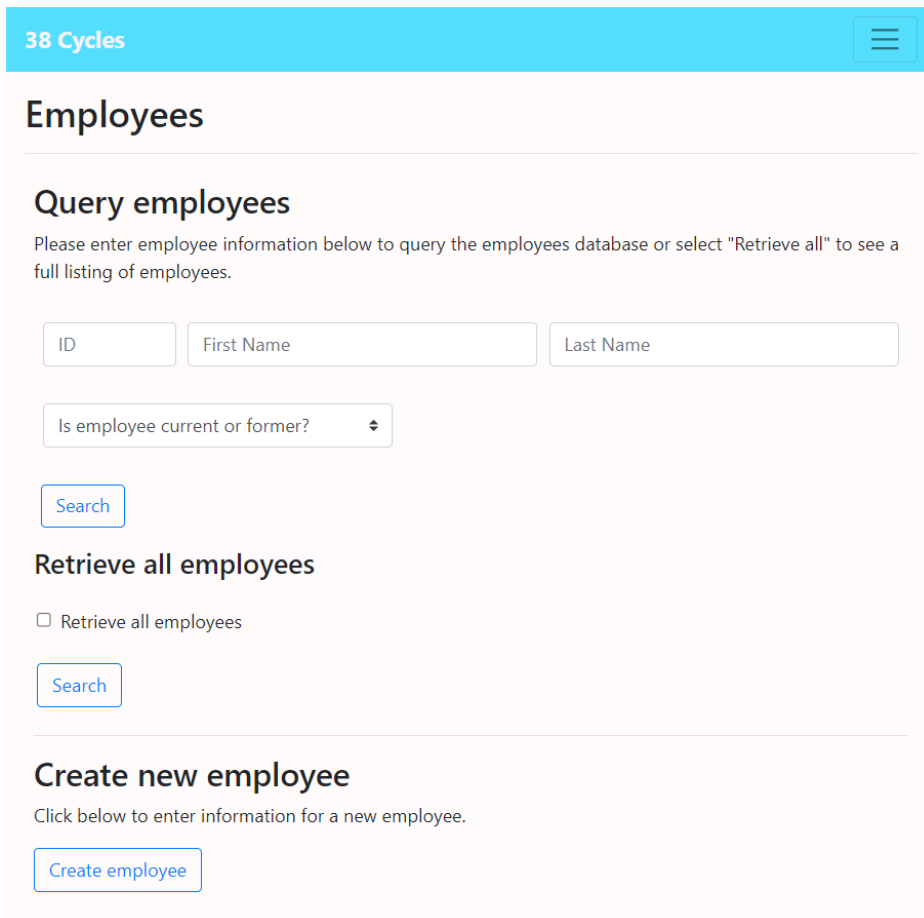
Welcome to 38 Cycles database administration.

Select the database table from the menu above to get started.

Please don't break the database. 🙍

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2) Employees Home Page

38 Cycles ☰

Employees

Query employees

Please enter employee information below to query the employees database or select "Retrieve all" to see a full listing of employees.

| ID | First Name | Last Name |

Is employee current or former?

[Search]

Retrieve all employees

☐ Retrieve all employees

[Search]

Create new employee

Click below to enter information for a new employee.

[Create employee]

3) Employees CREATE Page

38 Cycles ☰

Employees

Create new employee

Please enter information below to create new employee.

| First Name | Last Name |

Employee position

Choose position ⇅

Employment status

Is employee current or former? ⇅

[Submit]

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4) Employees CREATE Confirmation

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Employees

Employee successfully created.

eeFirstName: Bart

eeLastName: Simpson

eePosition: Sales Associate

eeStatus: 2

[Return to search] [Return to create]

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5) Employees READ page - Displays results from Search (implements a filtered/parameterized search and "retrieve all" search)

38 Cycles ☰

Employees

Results

eeId	eeFirstName	eeLastName	eePosition	eeStatus	**Modify**
28	Bob	Bunion	Floor Manager	Former	update
29	Laura	Bunion	Floor Manager	Former	update
31	John	Doe	Mechanic	Former	update
32	George	Jetson	Sales Associate	Former	update

Return to search

6) Employees UPDATE

38 Cycles ☰

Employees

Update existing employee

Please enter information below to update existing employee.

ID | First name | Last name
35 | Bart | Simpson

Employee position | Employment status
Sales Associate ⇕ | Current ⇕

Submit

7) Employees UPDATE Confirmation

38 Cycles

Employees

Employee successfully updated.

eeId: 35

eeFirstName: Bart

eeLastName: Simpson

eePosition: Sales Associate

eeStatus: 1

Return to search | Return to create

8) Customers Home Page

38 Cycles

Customers

Query customers

Please enter customer information below to query the customers database or select "Retrieve all" to see a full listing of customers.

| ID | First Name | Last Name |

| Email |

Search

Retrieve all customers

☐ Retrieve all customers

Search

Create new customer

Click below to enter information for a new customer.

Create customer

9) Customers CREATE page

38 Cycles ☰

Customers

Create new customer

Please enter information below to create new customer.

Matt		Smith

11dr@bbc.com	Yes ⇕

Submit

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10) Customers CREATE Confirmation

38 Cycles ☰

Customers

Customer successfully created.

customerFirstName: Matt

customerLastName: Smith

customerEmail: 11dr@bbc.com

membershipStatus: 1

Return to search   Return to create

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11) Customers READ Page (filtered/parameterized or "retrieve all")

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Customers

Results

customerId	customerFirstName	customerLastName	customerEmail	membershipStatus	Modify
28	John	Smith	johnsmith@example.com	No	update
29	Fred	Flintstone	yabadabadoo@example.com	Yes	update
30	Barney	Rubble	rubble@example.com	No	update
31	Wilma	Flintstone	pebblesmom@example.com	Yes	update
32	Betty	Rubble	bambamsmom@example.com	No	update
33	Matt	Smith	11dr@bbc.com	Yes	update
34	John	Conner	jc@skynet.com	Yes	update

Return to search

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12) Customers UPDATE Page

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Customers

Update existing customer

Please enter information below to update existing customer.

ID | First name | Last name
34 | Johnny | Conner

Email | Membership status
jc@skynet.com | Yes

Submit

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13) Customers UPDATE Confirmation Page

38 Cycles   ☰

Customers

Customer successfully updated.

customerId: 34

customerFirstName: Johnny

customerLastName: Conner

customerEmail: jc@skynet.com

membershipStatus: 1

[Return to search] [Return to create]

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14) Purchases Home Page

38 Cycles   ☰

Purchases

Query purchases

Please enter purchase information below to query the purchases database or select "Retrieve all" to see a full listing of purchases.

Purchase date

| mm/dd/yyyy   📅 |

| Purchase ID | | Customer ID | | Employee ID |

[Search]

Retrieve all purchases

☐ Retrieve all purchases

[Search]

Create new purchase

Click below to enter information for a new purchase.

[Create purchase]

15) Purchases CREATE Page

16) Purchases CREATE Confirmation Page

17) Purchases READ Page (filtered/parameterized or "retrieve all" search)

Purchases

Results

purchaseId	customerId	purchaseDate	creditCardNumb	creditCardExp	costOfSale	eeId	Modify	Delete
28	28	2022-02-18	1111111111111111	1111	1599.99	28	update	delete
29	29	1995-12-24	1111222233334444	1197	449.99	32	update	delete
30	31	1995-12-20	4444333322221111	0297	449.99	32	update	delete
32	31	2022-03-01	4000400040004000	1225	29.00	30	update	delete
34	32	2022-03-18	4444444444444444	1100	20.00	None	update	delete
35	31	2022-03-17	4444555566661111	1111	500.00	28	update	delete
36	31	2022-03-17	1234568791053756	9876	500.00	28	update	delete
37	32	2022-03-18	1111222233334444	1123	500.00	None	update	delete

Return to search

18) Purchases UPDATE Page

Purchases

Update existing purchase
Please enter information below to update existing purchase.

ID
`37`

Purchase date
`03/18/2022`

Customer ID
`32`

Employee ID
`None`

Credit Card Number
`1111222233334444`

Expires
`1123`
MMYY

Cost of sale
`500.00`

Note: Click "Add Items" to add new items. Enter Item ID and Item Quantity. Entering an Item Quantity of "0" for an existing item will delete it. Click "Start Over" to clear your edits.

[Add items]   [Start Over]

Item 1

`31` ⌄   `1`

Item 2

`32` ⌄   `2`

[Complete Purchase Update]

19) Purchases UPDATE Confirmation

38 Cycles ☰

Purchases

Purchase successfully updated.

purchaseId: 37

purchaseDate: 2022-03-18

customerId: 32

eeId: 32

creditCardNumb: 1111222233334444

creditCardExp: 1123

costOfSale: 500.00

itemId1: 31

itemQuantity1: 1

itemId2: 32

itemQuantity2: 3

Return to search Return to create

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20) Purchases DELETE Page

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Purchases

Delete purchase

Please review the information below and confirm you would like to delete the purchase, or select "Return to Results".

Purchase ID: 34

Customer ID: 32

Purchase Date: 2022-03-18

Cost of Sale: 20.00

Employee ID: None

Warning: Clicking "Delete Purchase" below will permanently delete the purchase from the database.

☐ Yes I would like to delete the purchase

Delete Purchase Return to search

21) Purchases DELETE Confirmation

38 Cycles

Purchases

Purchase successfully deleted.

Purchase ID: 34

Customer ID: 32

Purchase Date: 2022-03-18

Cost of Sale: 20.00

Employee ID: None

Return to search   Return to create

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22) Items Home Page

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Items

Query items

Please enter item information below to query the items database or select "Retrieve all" to see a full listing of items.

Item ID   Item Name   Price

Item Type

Select your option ⌄

Search

Retrieve all items

☐ Retrieve all items

Search

Create new item

Click below to enter information for a new item.

Create item

23) Items CREATE Page

38 Cycles ☰

Items

Create new item

Please enter information below to create new item.

| Water Bottle Clip | 11.99 |

| Blue Water Bottle Clip |

| Select item type ▾ | Inventory on hand |

[Submit]

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24) Items CREATE Confirmation

38 Cycles ☰

Items

Item successfully created.

itemName: Water Bottle Clip

itemPrice: 11.99

itemDescription: Blue Water Bottle Clip

itemType: Accessory

inventoryOnHand: 100

[Return to search] [Return to create]

25) Items READ Page (filtered/parameterized or "retrieve all")

38 Cycles ☰

Items

Results

itemId	itemName	itemPrice	itemDescription	itemType	inventoryOnHand	Modify
28	Full Suspension Mountain Bike	1599.99	goes up mountain and down	Mountain Bike	21	update
29	Road Bike	449.99	white with blue rims	Road Bike	19	update
30	Road Bike	449.99	white with purple rims	Road Bike	21	update
31	Water Bottle Holder	15.99	Water bottle holder to mount to frame	Accessory	8	update
32	38 Cycling T-shirt	19.99	Unisex One Size 38 Cycles T-shirt	Apparel	49	update
33	Bell	10.00	Bell for mountain bike to alert people nearby	Accessory	1	update
34	Water Bottle Clip	11.99	Blue Water Bottle Clip	Accessory	100	update

Return to search

26) Items UPDATE Page

38 Cycles ☰

Items

Update existing item
Please enter information below to update existing item.

ID
34

Item name
Water Bottle Clip

Price
12.99

Description
Blue Water Bottle Clip

Item type
Accessory

Inventory
100

Submit

27) Items UPDATE Confirmation

38 Cycles ☰

Items

Item successfully updated.

itemId: 34

itemName: Water Bottle Clip

itemPrice: 12.99

itemDescription: Blue Water Bottle Clip

itemType: Accessory

inventoryOnHand: 100

Return to search | Return to create

28) Error Page

38 Cycles ☰

404 Not Found

The requested URL was not found on the server. If you entered the URL manually please check your spelling and try again.

Return Home

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