|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| מס' קבוצה | אתר | | | תאריך הגשה |
| 46 | <https://kustomkitgymequipment.com/> | | | 14/05/2023 |
| חברי הצוות – מספרי ת.ז | | | | |
| 322661075 | | 208343491 | 318720711 | |

## פרויקט בסיסי נתונים

## מטלה 1 (40%) – עיצוב קונספטואלי (תרשים ישויות-קשרים)

**ERD קודם:**

A screenshot of a computer

Description automatically generated with medium confidence

הערות הבודק שצריך לתקן:

\*הקשר בון CUSTOMER ו- ORDER מיותר הוא ניכר מהקשר ORDER ל- CREDIT CARD

\* SEARCH לא מוביל לORDER אלא הוא מוביל ל- PRODUCT ורק אם הלקוח מעוניין במוצר אז הוא יבצע הזמנה

\*ישות חלשה היא תמיד בין יחיד לרבים, חשבו על דרך אחרת למדל את SHIPMENT

\*לכל חיפש יכול להיות רק לקוח אחד שמחפש אותו. גם אם השאלה בחיפוש היא אותה שאלה. תחשבו על המזהיים של SEARCH בשביל להבין את זה.

\*הערך RESULTS לא צריך להיות שדה, הוא צריך להיוBת קשר ל- PRODUCT

## תרשים ERD מתוקן:

## A screenshot of a computer screen Description automatically generated with low confidence

**הנחות ERD מתוקן:**

|  |  |
| --- | --- |
| **מרכיב** | **הנחות** |
| RATING  קשר בין מוצר ללקוח | לקוח לא יכול לדרג מוצר מסוים יותר מפעם אחת. |
| CREDIT CARD | אמצעי תשלום אפשרי הינו אך ורק כרטיס אשראי אחד ויחיד. |
| SEARCH | לא בהכרח חיפוש יניב תוצאות. |
| הקשר בין לקוח להזמנה | ישנה אפשריות לבצע הזמנה מבלי תהליך חיפוש |

## מטלה 2 (30%) – עיצוב לוגי (מודל נתונים טבלאי)

**Customers** (Email Address, First Name, Last Name, Phone Number)

**Countries**(Country, Email Address(Customers))

**Products** (Product ID, Product Name , Description, Price, Stock Level)

**Credit Cards** (CC-Number, CC-Expiration, CC-CVV, Email-Address(Customers))

**Orders**(Order ID, Order DT, Note, CC-Number(Credit Cards),Shipment ID(Shipments))

**Shipments**(Shipment ID, Shipment DT, Driver, Address)

**Searches(**Search IP, Search DT, Email Address(Customers),Search query)

**Ratings**(Email Address(Customers),Product ID(Products),Rank, Date, Comment)

**Including**(Product ID(Products),Order ID(Orders))

**Leading(**Product ID(Products),{Search IP, Search DT, Email Address}(Searches))

\*בדקנו נרמול עד לסדר שלישי ולא מצאנו הפרות נרמול ,לכן אין צורך בנרמול של טבלאות

# פירוט שדות בסיס הנתונים והערכת גודלם:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table** | **Field** | **Data Type** | | **Notes** | **Size (Bytes)** |
| **Customers** | Email Address | Varchar(50) | |  | 50 |
| First Name | Varchar(20) | |  | 20 |
| Last Name | Varchar(20) | |  | 20 |
| Phone Number | Varchar(13) | |  | 13 |
| Country | Varchar(20) | |  | 20 |
| **Total Record Size (Bytes)** | | |  | **123** |
| **Products** | Product ID | Integer | |  | 4 |
| Product Name | Varchar(20) | |  | 20 |
| Description | Varchar(100) | |  | 100 |
| Price | Money | |  | 8 |
| Stock Level | Varchar(3) | | Yes/no | 3 |
| **Total Record Size (Bytes)** | | |  | **135** |
| **Credit Cards** | CC-Number | Char(16) | |  | 16 |
| CC-Expiration | Integer | |  | 4 |
| CC-CVV | Char(3) | |  | 3 |
| **Total Record Size (Bytes)** | | |  | **23** |
| **Orders** | Order ID | Integer | |  | 4 |
| Order DT | Date | |  | 3 |
| Note | Varchar(50) | |  | 50 |
| CC-Number(Credit Cards) | Char(16) | |  | 16 |
| Shipment ID(Shipments) | Integer | |  | 4 |
| **Total Record Size (Bytes)** | | |  | **77** |
| **Shipments** | Shipment ID | Integer | |  | 4 |
| Shipment DT | Date | |  | 4 |
| Driver | Varchar(20) | |  | 20 |
| Address | Varchar(50) | |  | 50 |
| **Total Record Size (Bytes)** | | |  | **78** |
| **Searches** | Search IP | Integer | |  | 4 |
| Search DT | Date Time | |  | 8 |
| Email Address(Customers) | Varchar(50) | |  | 50 |
| Search query | Varchar(50) | |  | 50 |
| **Total Record Size (Bytes)** | | |  | **112** |
| **Rating** | Email Address(Customers) | Varchar(50) | |  | 50 |
| Product ID(Products) | Integer | |  | 4 |
| Rank | Char(1) | |  | 1 |
| Date | Date | |  | 4 |
| Comment | Varchar(100) | |  | 100 |
| **Total Record Size (Bytes)** | | |  | **159** |
| **Including** | Product ID(Products) | Integer | |  | 4 |
| Order ID(Orders) | Integer | |  | 4 |
|  |  | |  | **8** |
| **Leading** | Product ID(Products) | Integer | |  | 4 |
| SearchIP(Searches) | Integer | |  | 4 |
| SearchDT(Searches) | DateTime | |  | 8 |
| EmailAddress(Customers) | Varchar(50) | |  | 50 |
| **Total Record Size (Bytes)** | | |  | **66** |
| **Countries** | Country | | Varchar(20) |  | 20 |
|  | **Total Record Size (Bytes)** | | |  | **20** |

\*בטבלת ORDERS בשדה ORDER DT בחרנו ב DATE כי המזהה הוא ה ORDER ID (לא היה צורך לשמור גם את השעה).

\*בחרנו בשדה SEARCH DT להיות DATE TIME כדי שנשמור גם את השעה, כי יכול להיות שלקוח יבצע כמה חיפושים באותו תאריך ואז צריך להפריד ביניהם דרך השעה.

## מטלה 3 (30%) - עיצוב פיסי (בסיס נתונים פעיל על שרת RDBMS)

**בניית הטבלאות לפי הסדר הנכון כולל אילוצי מרחב ערכים (אילוצי בדיקה**

create table Customers(

EmailAddress Varchar(50) Not Null PRIMARY KEY,

FirstName Varchar(20) Not Null,

LastName Varchar(20) Not Null,

PhoneNumber VARCHAR(13)Not Null,

Country varchar(20) not null,

CONSTRAINT ck\_EmailAddress CHECK (EmailAddress LIKE '%@%.%'),

constraint CK\_phoneNumber CHECK (PhoneNumber LIKE '%[0-9]%')

--The first constraint checks for '@' and '.'

--The second constraint checks all digits as numbers

)

CREATE TABLE Products (

ProductID INT not null PRIMARY KEY,

ProductName VARCHAR(20) not null,

Description VARCHAR(100),

Price money,

StockLevel VARCHAR(3),

constraint CK\_Price CHECK (Price > 0 ),

constraint CK\_StockLevel CHECK (StockLevel IN ('yes','no'))

--The first constrain checks for price bigger than 0

--The second constraint checks for "yes" or "no" answer

)

CREATE TABLE Shipments (

ShipmentID INT not null PRIMARY KEY,

ShipmentDT DATE not null,

Driver VARCHAR(20),

Address VARCHAR(50),

)

create table Countries(

Country VARCHAR(20) Not Null primary key,

--lookup table for countries to help the user find the country

)

ALTER TABLE Customers

ADD CONSTRAINT fk\_Country foreign key (Country) REFERENCES Countries(Country)

CREATE TABLE CreditCards (

CCNumber char(16) not null PRIMARY KEY,

CCExpiration Varchar(5) not null,

CCCVV CHAR(3)not null ,

EmailAddress Varchar(50) Not Null,

constraint fk\_Customer foreign key (EmailAddress) references Customers(EmailAddress),

constraint CK\_CCNumber CHECK (CCNumber LIKE '%[0-9]%'),

constraint CK\_CCExpiration CHECK (CCExpiration LIKE '[0-9][0-9]/[0-9][0-9]'),

constraint CK\_CCCVV CHECK (CCCVV LIKE '%[0-9]%')

--The first constraint checks for digits

--The second constraint checks for valid date

--The third constraint checks for digits

)

CREATE TABLE Orders (

OrderID INT not null PRIMARY KEY,

OrderDT DATE not null,

Note VARCHAR(50),

CCNumber char(16) not null,

ShipmentID INT not null,

constraint fk\_CreditCards foreign key (CCNumber) REFERENCES CreditCards(CCNumber),

constraint fk\_Shipment foreign key (ShipmentID) REFERENCES Shipments(ShipmentID),

)

CREATE TABLE Searches (

SearchIP INT not null,

SearchDT DATETime not null,

EmailAddress VARCHAR(50) not null,

SearchQuery VARCHAR(50),

constraint CK\_Search primary key(SearchIP,SearchDT,EmailAddress),

constraint fk\_EmailAddress foreign key (EmailAddress)REFERENCES Customers(EmailAddress)

)

CREATE TABLE Ratings (

EmailAddress VARCHAR(50) not null,

ProductID INT not null,

Rank char(1),

RatingDate DATE,

Comment VARCHAR(100),

constraint Pk\_Rating PRIMARY KEY (EmailAddress, ProductID),

constraint fk\_Email foreign key (EmailAddress) REFERENCES Customers(EmailAddress),

constraint fk\_Product foreign key (ProductID) REFERENCES Products(ProductID),

constraint Ck\_Rank check (Rank like '[0-5]'),

--The constrains checks for rank between 0 and 5

)

create table Including (

ProductID INT not null,

OrderID INT not null,

constraint Pk\_Includes PRIMARY KEY (OrderID, ProductID),

constraint fk\_Order foreign key (OrderID) REFERENCES Orders(OrderID),

constraint fk\_Product2 foreign key (ProductID) REFERENCES Products(ProductID),

)

create table Leading(

ProductID INT not null,

SearchIP INT not null,

SearchDT DATETime not null,

EmailAddress VARCHAR(50) not null,

constraint Pk\_Leads PRIMARY KEY (ProductID, SearchIP,SearchDT,EmailAddress),

constraint fk\_Search foreign key (SearchIP,SearchDT,EmailAddress) REFERENCES Searches(SearchIP,SearchDT,EmailAddress),

constraint fk\_Product3 foreign key (ProductID) REFERENCES Products(ProductID),

)

**הזנת נתונים לבדיקה:**

--Filling All The Tables--

INSERT INTO Countries (Country) VALUES

('Germany'),

('Egypt'),

('Israel'),

('Turkey'),

('Algeria'),

('England')

INSERT INTO Customers (EmailAddress, FirstName, LastName, PhoneNumber,Country) VALUES

('dani@post.bgu.ac.il', 'Dani', 'Mirkin', '0549504556','Algeria'),

('aiman@yalla.com', 'aiman', 'khalil', '0555846822','Turkey'),

('saher@hotmail.com', 'saher', 'sharif', '0542598723','Egypt'),

('yossi@gmail.com', 'yossi', 'benayoon', '0532531234','Germany'),

('Christiano@live.com', 'Christiano', 'Ronaldo', '0514569874','England')

INSERT INTO Products (ProductID, ProductName, Description, Price, StockLevel) VALUES

(1, 'dumbbell', '', '100', 'yes'),

(2, 'bench', '', '50', 'no'),

(3, 'plate', '', '70', 'yes'),

(4, 'rack', 'new adjustable', '500', 'no'),

(5, 'bar', '', '700', 'no')

INSERT INTO Shipments (ShipmentID,ShipmentDT,Driver,Address) values

(123455, '01/13/2026', 'Aiman', 'Israel.Haifa'),

(543215 ,'01/22/2025' , 'Saher', 'Israel.Nahria'),

(162535, '04/22/2025', 'Dani', 'Turkey.Istanbul'),

(849265, '08/23/2025','Dani', 'UnitedStates.NewYork'),

(904625,'07/16/2025','Aiman','Germany.Berlin')

INSERT INTO CreditCards (CCNumber, CCExpiration, CCCVV, EmailAddress) VALUES

('1234567891112135', '10/25', '123', 'Christiano@live.com'),

('1578932456820482', '11/28', '987', 'yossi@gmail.com'),

('1578932456820408', '09/29', '520', 'saher@hotmail.com'),

('5828932456820402', '07/26', '470', 'aiman@yalla.com'),

('1578932456822082', '04/25', '343', 'dani@post.bgu.ac.il')

INSERT INTO Orders (OrderID, OrderDT, Note, CCNumber,ShipmentID) VALUES

(1, '07/23/2024', '', '1234567891112135','123455'),

(2, '10/26/2024', '', '1578932456822082','904625'),

(3, '10/08/2028', 'leave at the door', '1578932456820482','162535'),

(4, '05/01/2024', 'not home', '5828932456820402','849265'),

(5, '10/08/2026', '', '1578932456822082','904625')

INSERT INTO Searches(SearchIP, SearchDT, EmailAddress, SearchQuery) VALUES

(11, '01/12/2026 10:12:21 PM', 'Christiano@live.com', 'where is the puckage'),

(12 ,'01/26/2025 09:44:59 PM' , 'dani@post.bgu.ac.il', ''),

(13, '05/04/2025 03:45:36 PM', 'aiman@yalla.com', ''),

(14, '12/08/2025 04:53:11 AM','saher@hotmail.com', 'when'),

(15,'07/13/2025 09:44:59 PM','yossi@gmail.com','how')

INSERT INTO Ratings (EmailAddress, ProductID, Rank, RatingDate,Comment) VALUES

('Christiano@live.com', 1, '1', '10/08/2025',''),

('dani@post.bgu.ac.il', 2, '5', '12/01/2026',''),

('yossi@gmail.com', 3, '3', '02/04/2025','I like it!!!'),

('saher@hotmail.com', 4, '2', '07/08/2025',''),

('aiman@yalla.com', 5, '4', '08/24/2025','not good')

INSERT INTO Including (ProductID, OrderID) VALUES

(1, 5),

(2, 2),

(3, 3),

(4, 4),

(5, 1)

INSERT INTO Leading(ProductID, SearchDT,SearchIP,EmailAddress) VALUES

(1, '01/12/2026 10:12:21 PM',11,'Christiano@live.com'),

(2, '01/26/2025 09:44:59 PM',12,'dani@post.bgu.ac.il'),

(3, '05/04/2025 03:45:36 PM',13,'aiman@yalla.com'),

(4, '12/08/2025 04:53:11 AM',14,'saher@hotmail.com'),

(5, '07/13/2025 09:44:59 PM',15,'yossi@gmail.com')

**מחיקת טבלאות ואילוצים:**

--Delete script:--

ALTER TABLE Leading

DROP CONSTRAINT Pk\_Leads,fk\_Search,fk\_Product3

DROP TABLE Leading

ALTER TABLE Including

DROP CONSTRAINT Pk\_Includes,fk\_Order,fk\_Product2

DROP TABLE Including

ALTER TABLE Ratings

DROP CONSTRAINT Pk\_Rating,fk\_Email,fk\_Product,Ck\_Rank

DROP TABLE Ratings

ALTER TABLE Searches

DROP CONSTRAINT Ck\_Search,fk\_EmailAddress

DROP TABLE Searches

ALTER TABLE Orders

DROP CONSTRAINT fk\_CreditCards,fk\_Shipment

DROP TABLE Orders

ALTER TABLE CreditCards

DROP CONSTRAINT fk\_Customer,CK\_CCNumber,CK\_CCExpiration,CK\_CCCVV

DROP TABLE CreditCards

DROP TABLE Shipments

ALTER TABLE Products

DROP CONSTRAINT CK\_Price,CK\_StockLevel

DROP TABLE Products

ALTER TABLE Customers

DROP CONSTRAINT ck\_EmailAddress,CK\_PhoneNumber

DROP TABLE Customers

DROP TABLE Countries