CPSC 304 Project Cover Page

Milestone #: _ 2_

Date: _____2022-July-27th_____

Group Number: __36_____
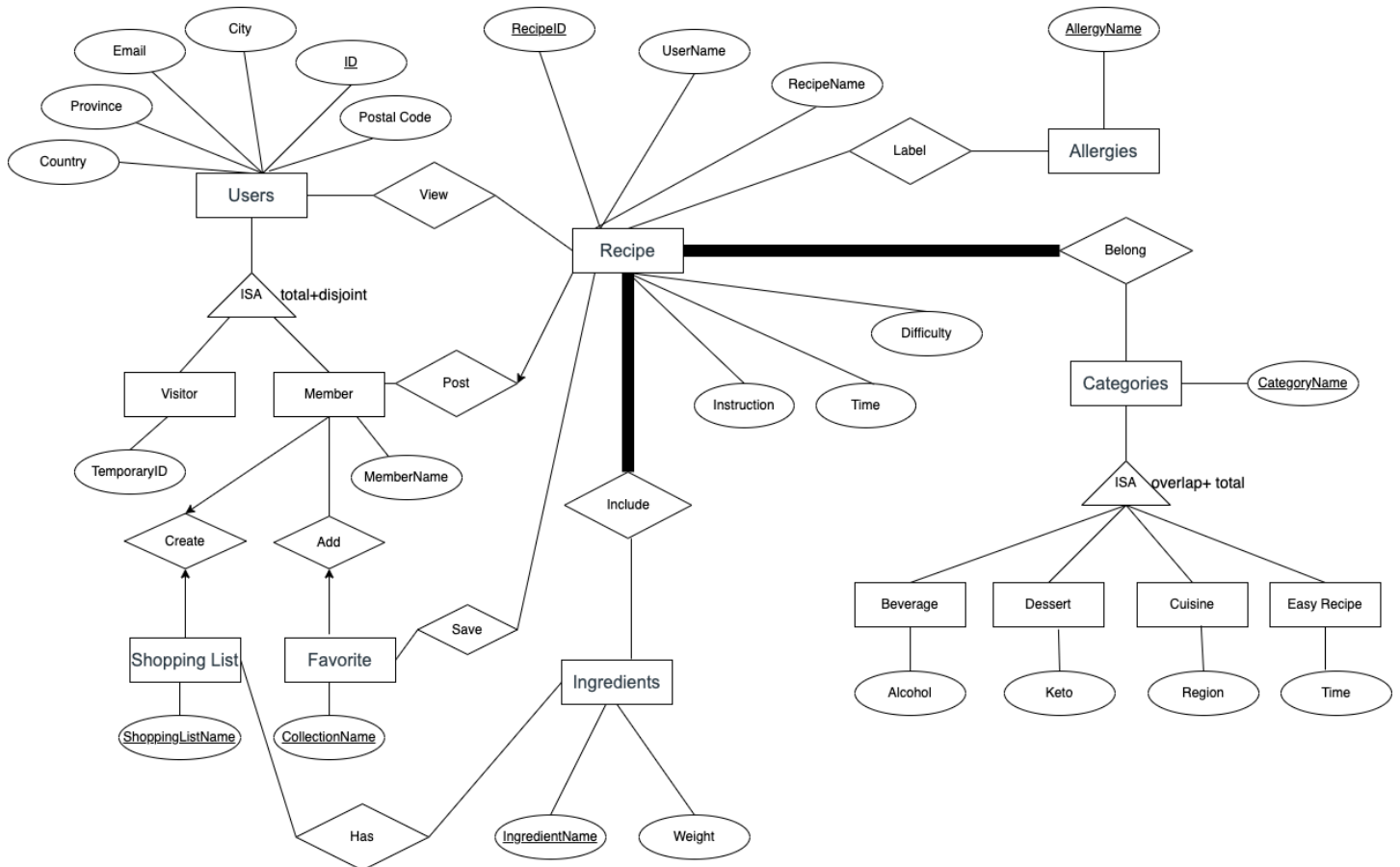
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By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included above. (In the case of Project Milestone 0, the main purpose of this page is for you to let us know your e-mail address, and then let us assign you to a TA for your project supervisor.)
In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia

2. Changes made to ER diagram

- Category - Recipe: remove total participation
- ShoppingList - Ingredient relationship name changed from List to Has
- TemporaryID is no longer a primary key of Visitor
- MemberName is no longer a primary key of Member
- Recipe attribute changed:
    - remove image
    - add time and recipeID, recipeID is set as the only key
- User attribute changed:
    - add email, city, province, country, postal code

Primary key is underlined,foreign keys are bold, candidate keys of each are listed after relational model, if no candidate key are specified for a relational model that means no candidate key

Users (<u>ID</u>: int, PostalCode: VARCHAR2, City:VARCHAR2, Country:VARCHAR2, Email:VARCHAR2, Province:VARCHAR2) Candidate Key: Email

View(**<u>RecipeID</u>**: int, **<u>ID</u>**: int)

Recipe(<u>RecipeID</u>: int, UserName: VARCHAR2, RecipeName: VARCHAR2, Difficulty: int, Instruction: VARCHAR2,Time: int) Candidate Key: (UserName, RecipeName)

Visitor(**<u>ID</u>**: int, TemporaryID: int)

Member(**<u>ID</u>**: int, MemberName:VARCHAR2)

Recipe_Post(<u>RecipeID</u>: int, **ID**: int)

ShoppingList_Create(<u>ShoppingListName</u>: VARCHAR2, **ID**:VARCHAR2) ID UNIQUE Candidate Key: ID

Favorite_Add(<u>CollectionName</u>: VARCHAR2, **ID**: int)

Has (**<u>ShoppingListName</u>**: VARCHAR2,**<u>IngredientName</u>**: VARCHAR2)

ShoppingList(<u>ShoppingListName</u>: VARCHAR2)

Ingredients(<u>IngredientName</u>: VARCHAR2, Weight: int)

Save(**<u>CollectionName</u>**:VARCHAR2, **<u>RecipeID</u>**: int)

Favorite(<u>CollectionName</u>: VARCHAR2)

Include(**<u>IngredientName</u>**: VARCHAR2, **<u>RecipeID</u>**: int)

Label(**<u>AllergyName</u>**:VARCHAR2, **<u>RecipeID</u>**: int)

Allergies(<u>AllergyName</u>:VARCHAR2)

Belong(**<u>RecipeID</u>**: int,**<u>CategoryName</u>**:VARCHAR2)

Beverage(**<u>CategoryName</u>**: VARCHAR2, Alcohol: int)

Dessert(**<u>CategoryName</u>**: VARCHAR2, Keto: int)

Cuisine(**<u>CategoryName</u>**: VARCHAR2, Region: VARCHAR2)

EasyRecipe(**<u>CategoryName</u>**: VARCHAR2, Time: int)

4. FDs

a. Recipe: Instruction -> Difficulty, Time

   Time->Difficulty

   RecipeID -> UserName,RecipeName

b. User : PostalCode, Province -> City, Country

   ID -> Email

   Country,City -> Province

   Country,PostalCode -> Province

5. Normalization (3NF / BCNF)

c. Recipe (UserName, RecipeID, RecipeName, Difficulty, Instruction, Time): not in BCNF

   i. Closure : Instruction+= {Instruction, Difficulty, Time}

      Time+={Time, Difficulty}

      RecipeID+={RecipeID,UserName, RecipeName}

   ii. Minimal key: Instruction, RecipeID

   iii. Not in BCNF and 3NF

   iv. Normalization to BCNF:

      1. R1 (Instruction, Difficulty, Time)
         R2(UserName,RecipeName,RecipeID,Instruction)

      2. Keep decomposing R2
         R3(UserName,RecipeName,RecipeID) R4(Instruction, RecipeID)

   v. Therefore, R1 (Instruction,Difficulty,Time) , R3(UserName,RecipeName,RecipeID) and R4(Instruction, RecipeID) are in BCNF

b. User (ID, PostalCode, City, Country, Email, Province):

   FDs: PostalCode, Province -> City, Country

      ID -> Email

      Country,City -> Province

      Country,PostalCode -> Province

   I. Closure: PostalCode Province+ = {PostalCode,Province,City,Country}

      ID += {ID,Email}

      Country City + = {Country, City, Province}

      Country,PostalCode+={Country,PostalCode,Province,City}

   II. Minimal key: (PostalCode,ID,Province)

      (PostalCode,ID,Country)

   This is neither in BCNF nor 3NF

III. minimal Cover:
1. PostalCode, Province -> City
   PostalCode, Province -> Province
   ID -> Email
   Country,City -> Province
   Country,PostalCode -> Province
2. Nothing done
3. PostalCode, Province -> City
   ID -> Email
   Country,PostalCode -> Province

IV. synthesis method:
   R1(PostalCode, Province, City)
   R2(ID, Email)
   R3(Country,PostalCode,Province)
   R4 (PostalCode,ID,Country)

6. SQL DDL

```
CREATE TABLE Users (
      ID            INTEGER    PRIMARY KEY,
      PostalCode   VARCHAR2(30),
      City          VARCHAR2(15),
      Country       VARCHAR2(30),
      Email         VARCHAR2(40),
      Province      VARCHAR2(30));

CREATE TABLE Visitor (
      ID                   INTEGER,
      TemporaryID          INTEGER,
      PRIMARY KEY (ID),
      FOREIGN KEY (ID) REFERENCES Users);

CREATE TABLE Member(
      ID                   INTEGER,
      MemberName        VARCHAR2(30),
      PRIMARY KEY (ID),
      FOREIGN KEY (ID) REFERENCES Users);
```

```sql
CREATE TABLE View (
        ID                      INTEGER,
        RecipeID                INTEGER,
        PRIMARY KEY (ID, RecipeID),
        FOREIGN KEY (ID) REFERENCES Users,
        FOREIGN KEY (RecipeID) REFERENCES Recipe);

CREATE TABLE Recipe_Post(
        RecipeID                INTEGER,
        ID                      INTEGER,
        PRIMARY KEY (RecipeID),
        FOREIGN KEY (ID) REFERENCES Member);

CREATE TABLE ShoppingList_Create (
        ShoppingListName     VARCHAR2(30),
        ID                      INTEGER,
        PRIMARY KEY (ShoppingListName),
        FOREIGN KEY (ID) REFERENCES Member,
        UNIQUE (ID);

CREATE TABLE Favorite_Add(
        CollectionName     VARCHAR2(30),
         ID                     INTEGER,
         PRIMARY KEY (CollectionName),
         FOREIGN KEY (ID) REFERENCES Member);

CREATE TABLE Has(
         ShoppingListName          VARCHAR2(30),
         IngredientName            VARCHAR2(30),
          PRIMARY KEY (ShoppingListName, IngredientName),
          FOREIGN KEY (ShoppingListName) REFERENCES ShoppingList,
          FOREIGN KEY (IngredientName) REFERENCES Ingredients);

CREATE TABLE ShoppingList(
         ShoppingListName    VARCHAR2(30)  PRIMARY KEY);
```

```sql
CREATE TABLE Recipe(
        RecipeID      INTEGER  PRIMARY KEY,
        UserName      VARCHAR2(30),
        RecipeName   VARCHAR2(15),
        Difficulty       INTEGER,
        Instruction     VARCHAR2(300),
        Time             INTEGER);

CREATE TABLE Include(
        RecipeID               INTEGER,
        IngredientName       VARCHAR2(30),
        PRIMARY KEY (RecipeID, IngredientName)
        FOREIGN KEY (RecipeID) REFERENCES Recipe,
        FOREIGN KEY (IngredientName) REFERENCES Ingredients);

CREATE TABLE Belong(
        RecipeID               INTEGER,
        CategoryName         VARCHAR2(30),
        PRIMARY KEY (RecipeID, CategoryName),
        FOREIGN KEY (RecipeID) REFERENCES Recipe,
        FOREIGN KEY (CategoryName) REFERENCES Beverage, Dessert, Cuisine,
    EasyRecipe;

CREATE TABLE Label(
        RecipeID               INTEGER,
        AllergyName          VARCHAR2(30),
        PRIMARY KEY (RecipeID, AllergyName)
        FOREIGN KEY (RecipeID) REFERENCES Recipe,
        FOREIGN KEY (AllergyName) REFERENCES Allergies;

CREATE TABLE Save(
        RecipeID               INTEGER,
        CollectionName       VARCHAR2(30),
        PRIMARY KEY (RecipeID, CollectionName)
        FOREIGN KEY (RecipeID) REFERENCES Recipe ON DELETE CASCADE,
        FOREIGN KEY (CollectionName) REFERENCES Favorite);

CREAT TABLE Favorite(
        CollectionName      VARCHAR2   PRIMARY KEY);
```

```
CREATE TABLE Ingredients(
        IngredientName      VARCHAR2(30)      PRIMARY KEY,
        Weight              INTEGER);

CREATE TABLE Allergies(
        AllergyName         VARCHAR2(30)      PRIMARY KEY);


CREATE TABLE Beverage(
        CategoryName        VARCHAR2(30)       PRIMARY KEY,
        Alcohol     INTEGER);

CREATE TABLE Dessert(
        CategoryName        VARCHAR2(30)      PRIMARY KEY,
        Keto                INTEGER
);

CREATE TABLE Cuisine(
        CategoryName        VARCHAR2(30)      PRIMARY KEY,
        Region              VARCHAR2(30)
);

CREATE TABLE EasyRecipe(
        CategoryName        VARCHAR2(30)      PRIMARY KEY,
        Time                INTEGER
);
```

7. Populate each table with at least 5 tuples

INSERT INTO Users VALUES(1452,'M2H 9F0','Toronto','Canada','helloworld@gmail.com','Ontario');
INSERT INTO Users VALUES(5647,'G9S 0SD','Toronto','Canada','CPSC304@gmail.com','Ontario');
INSERT INTO Users VALUES(3632,'M2N 0G9','Toronto','Canada','dmp330@gmail.com','Ontario');
INSERT INTO Users VALUES(5200,'V6X 0S4','Richmond','Canada','helloJava@gmail.com','British Columbia');
INSERT INTO Users VALUES(5898,'V7X 1M8','Vancouver','Canada','helloPHP@gmail.com','British Columbia');

ID	PostalCode	City	Country	Email	Province
1452	M2H 9F0	Toronto	Canada	helloworld@gmail.com	Ontario
5647	G9S 0SD	Toronto	Canada	CPSC304@gmail.com	Ontario
3632	M2N 0G9	Toronto	Canada	dmp330@gmail.com	Ontario
5200	V6X 0S4	Richmond	Canada	helloJava@gmail.com	British Columbia
5898	V7X 1M8	Vancouver	Canada	helloPHP@gmail.com	British Columbia

INSERT INTO Visitor VALUES(1452,589756);
INSERT INTO Visitor VALUES(5647,412586);
INSERT INTO Visitor VALUES(3632,014759);
INSERT INTO Visitor VALUES(5200,245963);
INSERT INTO Visitor VALUES(5898,154456);

ID	TemporaryID
1452	589756
5647	412586
3632	014759
5200	245963
5898	154456

INSERT INTO Member VALUES(1452,'dancing monkey');
INSERT INTO Member VALUES(5647,'anonymous');
INSERT INTO Member VALUES(3632,'arbname');
INSERT INTO Member VALUES(5200,'avengers step parent');
INSERT INTO Member VALUES(5898,'captain canada');

ID	MemberName
1452	dancing monkey
5647	anonymous
3632	arbname
5200	avengers step parent
5898	captain canada

INSERT INTO View VALUES(1452,123456789);
INSERT INTO View VALUES(5647,987654321);
INSERT INTO View VALUES(3632,134679852);
INSERT INTO View VALUES(5200,794613258);
INSERT INTO View VALUES(5898,179346820);

ID	RecipeID
1452	123456789
5647	987654321
3632	134679852
5200	794613258
5898	179346820

INSERT INTO Recipe_Post VALUES(123456789,1452,);
INSERT INTO Recipe_Post VALUES(987654321,5647);
INSERT INTO Recipe_Post VALUES(134679852,3632);
INSERT INTO Recipe_Post VALUES(794613258,5200);
INSERT INTO Recipe_Post VALUES(179346820,5898);

RecipeID	ID
123456789	1452

987654321	5647
134679852	3632
794613258	5200
179346820	5898

INSERT INTO ShoppingList_Create VALUES('dancing list',1452,'dancing monkey');
INSERT INTO ShoppingList_Create VALUES('anonymous list',5647,'anonymous');
INSERT INTO ShoppingList_Create VALUES('arbname list',3632,'arbname');
INSERT INTO ShoppingList_Create VALUES('avengers list',5200,'avengers step parent');
INSERT INTO ShoppingList_Create VALUES('captain list',5898,'captain canada');

ShoppingListName	ID
dancing list	1452
anonymous list	5647
arbname list	3632
avengers list	5200
captain list	5898

INSERT INTO Favorite VALUES('dmonkey fav');
INSERT INTO Favorite VALUES('meal prep');
INSERT INTO Favorite VALUES('healthy diet');
INSERT INTO Favorite VALUES('fav recipe');
INSERT INTO Favorite VALUES('dessert collection');

CollectionName
dmonkey fav
meal prep
healthy diet

fav recipe
dessert collection

INSERT INTO Favorite_Add VALUES('dmonkey fav',1452);
INSERT INTO Favorite_Add VALUES('meal prep',5647);
INSERT INTO Favorite_Add VALUES('healthy diet',3632);
INSERT INTO Favorite_Add VALUES('fav recipe',5200);
INSERT INTO Favorite_Add VALUES('dessert collection',5898);

CollectionName	ID
dmonkey fav	1452
meal prep	5647
healthy diet	3632
fav recipe	5200
dessert collection	5898

INSERT INTO Has VALUES('dancing list', 'tomato');
INSERT INTO Has VALUES('anonymous list', 'lettuce');
INSERT INTO Has VALUES('arbname list', 'avocado');
INSERT INTO Has VALUES('avengers list', 'tea');
INSERT INTO Has VALUES('captain list', 'beef');

ShoppingListName	IngredientName
dancing list	tomato
dancing list	egg
dancing list	cucumber
anonymous list	lettuce
arbname list	avocado

avengers list	tea
captain list	beef

INSERT INTO ShoppingList VALUES('dancing list'');
INSERT INTO ShoppingList VALUES('anonymous list');
INSERT INTO ShoppingList VALUES('arbname list');
INSERT INTO ShoppingList VALUES('avengers list');
INSERT INTO ShoppingList VALUES('captain list');

ShoppingListName
dancing list
anonymous list
arbname list
avengers list
captain list

INSERT INTO Recipe VALUES(123456789, 'dancing monkey', 'seafood pasta', 4, '1.cook spaghetti and seafood 2.add tomato sauce', 60);
INSERT INTO Recipe VALUES(987654321, 'anonymous', 'caesar salad', 2, '1.combine dressing and lettuce', 30);
INSERT INTO Recipe VALUES(134679852, 'arbname', 'avocado toast', 1, '1.mash avocado 2. spread avocado on top of toast', 15);
INSERT INTO Recipe VALUES(794613258, 'avengers step parent', 'milk tea', 2, '1.place the tea leaves in a brewing pot 2.add milk', 30);
INSERT INTO Recipe VALUES(179346820, 'captain canada', 'beef burger', 3, '1.grill beef and burgers', 45);

RecipeID	UserName	RecipeName	Difficulty	Instruction	Time
123456789	dancing monkey	seafood pasta	4	1.cook spaghetti and	60

				seafood 2.add tomato sauce	
987654321	anonymous	caesar salad	2	1.combine dressing and lettuce	30
134679852	arbname	avocado toast	1	1.mash avocado 2. spread avocado on top of toast	15
794613258	avengers step parent	milk tea	2	1.place the tea leaves in a brewing pot 2.add milk	30
179346820	captain canada	beef burger	3	1.grill beef and burger	45

INSERT INTO Include VALUES(123456789, 'tomato');
INSERT INTO Include VALUES(123456789, 'shrimp');
INSERT INTO Include VALUES(123456789, 'spaghetti');
INSERT INTO Include VALUES(987654321, 'lettuce');
INSERT INTO Include VALUES(134679852, 'avocado');

RecipeID	IngredientName
123456789	tomato
123456789	shrimp
123456789	spaghetti
987654321	lettuce

134679852	avocado

INSERT INTO Belong VALUES(123456789, 'Canadian Dishes');
INSERT INTO Belong VALUES(987654321, '30-Minute Meals');
INSERT INTO Belong VALUES(134679852, 'Canadian Dishes');
INSERT INTO Belong VALUES(794613258, 'Tea Drinks');
INSERT INTO Belong VALUES(179346820, 'Canadian Dishes');

RecipeID	CategoryName
123456789	Canadian Dishes
987654321	30-Minute Meals
134679852	Canadian Dishes
794613258	Tea Drinks
794613258	Quick Drink
179346820	Canadian Dishes

INSERT INTO Label VALUES(123456789, 'nut');
INSERT INTO Label VALUES(987654321, 'diary');
INSERT INTO Label VALUES(134679852, 'gluten');
INSERT INTO Label VALUES(794613258, 'diary');
INSERT INTO Label VALUES(179346820, 'gluten');

RecipeID	AllergyName
123456789	nut
987654321	diary
134679852	gluten
794613258	diary
179346820	gluten

INSERT INTO Save VALUES(123456789, 'dmonkey fav');
INSERT INTO Save VALUES(987654321, 'meal prep');

INSERT INTO Save VALUES(134679852, 'healthy diet');
INSERT INTO Save VALUES(794613258, 'fav recipe');
INSERT INTO Save VALUES(179346820, 'fav recipe');

RecipeID	CollectionName
123456789	dmonkey fav
987654321	meal prep
134679852	healthy diet
794613258	fav recipe
179346820	fav recipe

INSERT INTO Ingredients VALUES('tomato', 200);
INSERT INTO Ingredients VALUES('chicken breast', 100);
INSERT INTO Ingredients VALUES('oats', 50);
INSERT INTO Ingredients VALUES('lettuce', 200);
INSERT INTO Ingredients VALUES('avocado', 100);

IngredientName	Weight
tomato	200
chicken breast	100
oats	50
lettuce	200
avocado	100

INSERT INTO Allergies VALUES('nut');
INSERT INTO Allergies VALUES('diary');
INSERT INTO Allergies VALUES('gluten');
INSERT INTO Allergies VALUES('egg');
INSERT INTO Allergies VALUES('shellfish');

AllergyName

nut
diary
gluten
egg
shellfish

INSERT INTO Beverage VALUES('Tea Drinks', 0);
INSERT INTO Beverage VALUES('Coffee Drinks', 0);
INSERT INTO Beverage VALUES('Cocktails', 1);
INSERT INTO Beverage VALUES('Juice', 0);
INSERT INTO Beverage VALUES('Smoothies', 0);

CategoryName	Alcohol
Tea Drinks	0
Coffee Drinks	0
Cocktails	1
Juice	0
Smoothies	0

INSERT INTO Dessert VALUES('CheeseCake', 1);
INSERT INTO Dessert VALUES('Cookie', 0);
INSERT INTO Dessert VALUES('Cupcake', 1);
INSERT INTO Dessert VALUES('IceCream', 0);
INSERT INTO Dessert VALUES(' Pie', 1);

CategoryName	Keto
CheeseCake	1
Cookie	0
Cupcake	1

IceCream	0
Pie	1

INSERT INTO Cuisine VALUES('Chinese Dishes', 'China');
INSERT INTO Cuisine VALUES("Mexican Dishes', 'Mexico');
INSERT INTO Cuisine VALUES('Indian Dishes ', 'India');
INSERT INTO Cuisine VALUES('Thai Dishes ', 'Thailand');
INSERT INTO Cuisine VALUES('Canadian Dishes', 'Canada');

CategoryName	Region
Chinese Dishes	China
Mexican Dishes	Mexico
Indian Dishes	India
Thai Dishes	Thailand
Canadian Dishes	Canada

INSERT INTO EasyRecipe VALUES('15-Minute Meals', 15);
INSERT INTO EasyRecipe VALUES('Quick Appetizers', 10);
INSERT INTO EasyRecipe VALUES(' Quick Side Dishes', 20);
INSERT INTO EasyRecipe VALUES('Quick Breakfast ', 10);
INSERT INTO EasyRecipe VALUES(' 30-Minute Meals', 30);

CategoryName	Time
15-Minute Meals	15
Quick Appetizers	10
Quick Side Dishes	20
Quick Breakfast	10
30-Minute Meals	30