CRUD Operations In Angular 7 Using Web API

In this article and code examples, you'll learn how perform CRUD operations in Angular 7 using a Web API and SQL Server database.

Mithilesh Kumar Jan 02 2019

CRUDWithAngular7.zip
Download Free .NET & JAVA Files API

In this step by step tutorial, I'm going to perform CRUD operations in an Angular 7 Web application. The backend is a SQL Server databse. A Web API is used to provide data connectivity between the database and the front end application. On the UI side, I will use Angular Material theme to create a rich, interactive and device-independent user experience.

I'm using Visual Studio Code as a tool to build my application. If you don't have Visual studio code in your system then first you have to download and install. Here is Visual Studio Code download link: Download Visual Studio Code Editor

Step 1. Create a database table

Create a database. Open SQL Server and create a new database table. As you can see from the following image, I create a database table called EmployeeDetails with 7 columns.

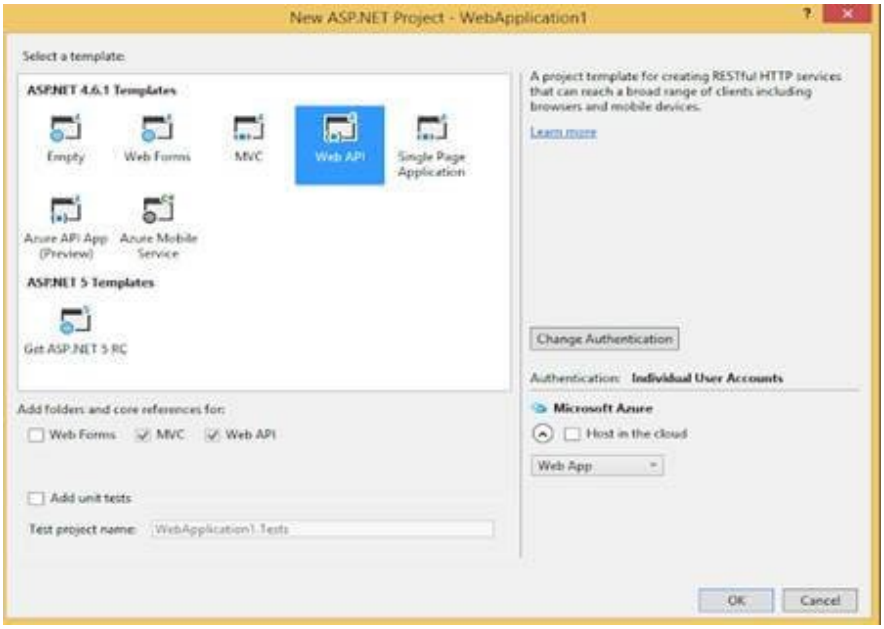
EmpName	varchar(50)	☑
DateOfBirth	date	☑
EmailId	varchar(50)	☑
Gender	nchar(10)	☑
Address	varchar(100)	☑
PinCode	varchar(50)	☑
		☐

Note: If you already have an exisitng database and table, you can skip this step.

Step 2. Create a Web API Project

Now, we will create a Web API with the functionaity of Create, Replace, Update and Delete (CRUD) operations.

Open Visual Studio >> File >> New >> Poject >> Select Web Application. After that click OK and you will see the templates. Select Web API template.



Click OK.

Step 3. Add ADO.NET Entity Data Model

Now, Select Models folder >> Right click >>Add >> New Item >> select Data in left panel >>ADO.NET Entity Data Model,

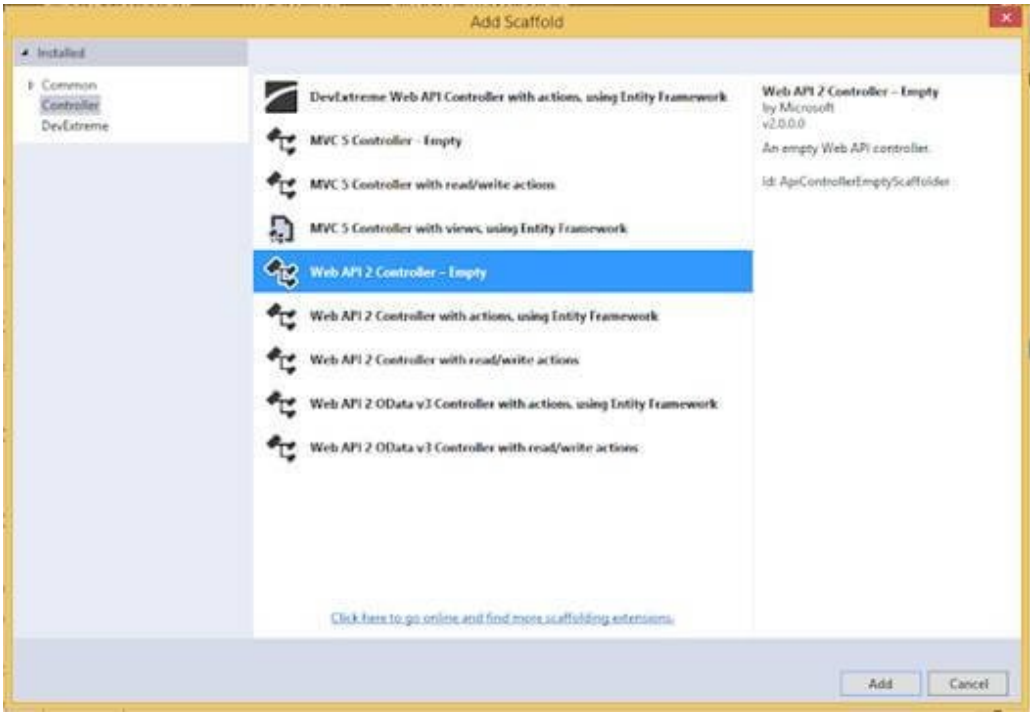
Now click Add button then select EF Designer from database >> Next >> After that give your SQL credential and select the database where your database table and data is.

Click Add button and select your table and click on Finish button.

Step 4. CRUD Operations

Now, we will write code to perform CRUD operation.

Go to the Controller folder in our API Application and right click >> Add >> Controller >> Select Web API 2 Controller-Empty



```
using System;
using System.Linq;
using System.Web.Http;
using CRUDAPI.Models;

namespace CRUDAPI.Controllers
{
    [RoutePrefix("Api/Employee")]
    public class EmployeeAPIController : ApiController
    {
        WebApiDbEntities objEntity = new WebApiDbEntities();

        [HttpGet]
        [Route("AllEmployeeDetails")]
        public IQueryable<EmployeeDetail> GetEmaployee()
        {
            try
            {
                return objEntity.EmployeeDetails;
            }
            catch(Exception)
            {
                throw;
            }
        }

        [HttpGet]
        [Route("GetEmployeeDetailsById/{employeeId}")]
        public IHttpActionResult GetEmaployeeById(string employeeId)
        {
            EmployeeDetail objEmp = new EmployeeDetail();
            int ID = Convert.ToInt32(employeeId);
            try
            {
                 objEmp = objEntity.EmployeeDetails.Find(ID);
                if (objEmp == null)
                {
                    return NotFound();
                }

            }
            catch (Exception)
            {
                throw;
            }

            return Ok(objEmp);
        }
```

```
        {

            if (!ModelState.IsValid)
            {
                return BadRequest(ModelState);
            }
            try
            {
                objEntity.EmployeeDetails.Add(data);
                objEntity.SaveChanges();
            }
            catch(Exception)
            {
                throw;
            }



            return Ok(data);
        }

        [HttpPut]
        [Route("UpdateEmployeeDetails")]
        public IHttpActionResult PutEmaployeeMaster(EmployeeDetail employ
        {
            if (!ModelState.IsValid)
            {
                return BadRequest(ModelState);
            }

            try
            {
                EmployeeDetail objEmp = new EmployeeDetail();
                objEmp = objEntity.EmployeeDetails.Find(employee.EmpId);
                if (objEmp != null)
                {
                    objEmp.EmpName = employee.EmpName;
                    objEmp.Address = employee.Address;
                    objEmp.EmailId = employee.EmailId;
                    objEmp.DateOfBirth = employee.DateOfBirth;
                    objEmp.Gender = employee.Gender;
                    objEmp.PinCode = employee.PinCode;

                }
                int i = this.objEntity.SaveChanges();

            }
            catch(Exception)
```

```
        }
        [HttpDelete]
        [Route("DeleteEmployeeDetails")]
        public IHttpActionResult DeleteEmaployeeDelete(int id)
        {
            //int empId = Convert.ToInt32(id);
            EmployeeDetail emaployee = objEntity.EmployeeDetails.Find(id)
            if (emaployee == null)
            {
                return NotFound();
            }

            objEntity.EmployeeDetails.Remove(emaployee);
            objEntity.SaveChanges();

            return Ok(emaployee);
        }
    }
}
```

As you may see from the above code, it has functionality to add, replace, update, and delete records to the table.

Step 5. Build UI Application

Now, we create the Web application in Angular 7 that will consume Web API.

First we have to make sure that we have Angular CLI installed.

Open command prompt and type below code and press ENTER:

npm install -g @angular/cli

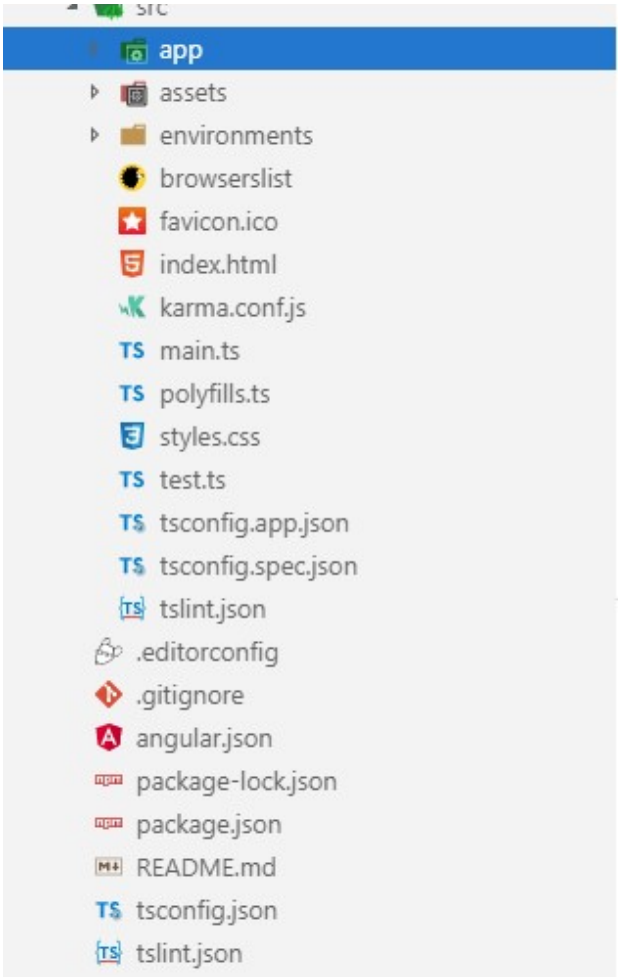
Now, open Visual Studio Code and create a project.

Open TERMINAL in Visual Studio Code and type the following syntax to create a new project. We name it Angularcrud.

ng new Angularcrud

After that, hit ENTER. It will take a while to create the project.

Once created, the project should loook like this.



Now, we can create some components to provide the UI.

I'm going to create a new component, Employee.

Go to the TERMINAL and go our angular project location using the following command:

cd projectName

```
E:\AngularExample\CRUDWithAngular5>cd Angularcrud

E:\AngularExample\CRUDWithAngular5\Angularcrud>
```

Now, write the following command that will create a component.

ng g c employee

Press ENTER.

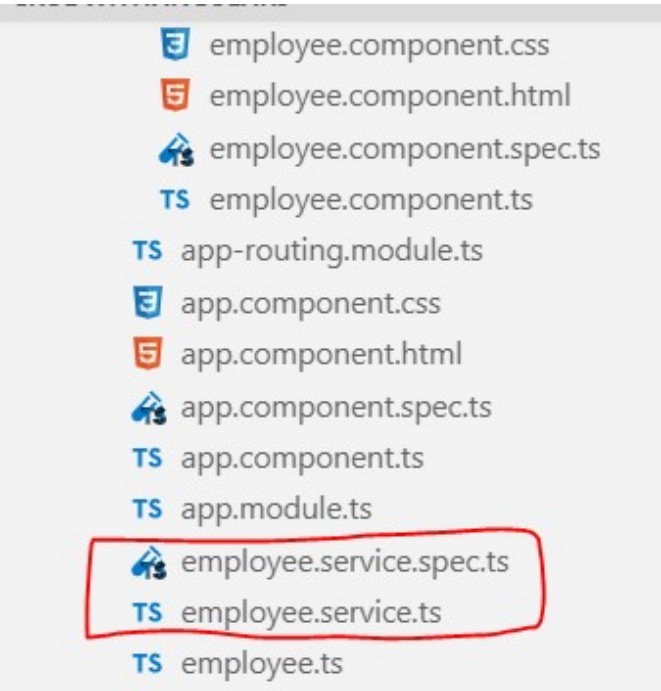
Step 6: Create a service

Now, we will create a service.

Open the TERMINAL and write the below command:

ng g s employee

Press ENTER and you will see two service files.



Now, we create a class like model class.

Open TERMINAL and write the below command:

ng g class employee

Now, write all properties of the Employee class related to an employee that matches with the database.

```
export class Employee {
    EmpId: string;
    EmpName: string;
    DateOfBirth: Date;
    EmailId: string;
    Gender: string;
```

Now, open employee.service.ts and first import necessary class and libraries and then make calls to the WebAPI methods.

```
import { Injectable } from '@angular/core';
import { HttpClient } from '@angular/common/http';
import { HttpHeaders } from '@angular/common/http';
import { Observable } from 'rxjs';
import { Employee } from './employee';

After that we write all methods related to consume web in employee.servic
 @Injectable({
  providedIn: 'root'
})

export class EmployeeService {
  url = 'http://localhost:65389/Api/Employee';
  constructor(private http: HttpClient) { }
  getAllEmployee(): Observable<Employee[]> {
    return this.http.get<Employee[]>
(this.url + '/AllEmployeeDetails');
  }
  getEmployeeById(employeeId: string): Observable<Employee> {
    return this.http.get<Employee>
(this.url + '/GetEmployeeDetailsById/' + employeeId);
  }
  createEmployee(employee: Employee): Observable<Employee> {
    const httpOptions = { headers: new HttpHeaders({ 'Content-
Type': 'application/json'}) };
    return this.http.post<Employee>
(this.url + '/InsertEmployeeDetails/',
    employee, httpOptions);
  }
  updateEmployee(employee: Employee): Observable<Employee> {
    const httpOptions = { headers: new HttpHeaders({ 'Content-
Type': 'application/json'}) };
    return this.http.put<Employee>
(this.url + '/UpdateEmployeeDetails/',
    employee, httpOptions);
  }
  deleteEmployeeById(employeeid: string): Observable<number> {
    const httpOptions = { headers: new HttpHeaders({ 'Content-
Type': 'application/json'}) };
    return this.http.delete<number>
(this.url + '/DeleteEmployeeDetails?id=' +employeeid,
 httpOptions);
  }
}
```

First, let's resolve this problem.

Go to the Web API project.

Download a Nuget package for CORS. Go to NuGet Package Manager and download the following file.

After that, go to App_Start folder in Web API project and open WebApiConfig.cs class. Here, modify the Register method with the below code.

```
Add namespace
using System.Web.Http.Cors;
var cors = new EnableCorsAttribute("*","*","*");
//origins,headers,methods
config.EnableCors(cors);
```

Step 7. Install and Configure Angular Material Theme

As I said earlier, we will use Angular Material theme to create a rich, interactive and device-oriented UI for our Web app.

Let's install Install Angular Material theme.

Open TERMINAL again and write the below command:

npm install --save @angular/material @angular/cdk @angular/animations

If you want learn more about Angular Material, visit here: link.

After installed successfully, we can check in package.json file.

```
  "@angular/compiler": "~7.0.0",
  "@angular/core": "~7.0.0",
  "@angular/forms": "~7.0.0",
  "@angular/http": "~7.0.0",
  "@angular/material": "^7.2.0",
  "@angular/platform-browser": "~7.0.0",
  "@angular/platform-browser-dynamic": "~7.0.0",
  "@angular/router": "~7.0.0",
  "@ng-bootstrap/ng-bootstrap": "^4.0.1",
  "bootstrap": "^4.1.3",
  "core-js": "^2.5.4",
  "rxjs": "~6.3.3",
  "zone.js": "~0.8.26"
},
```

Now, let's all required libraries in app.module.ts. We also import a date picker because we'll use the date picker for date of birth field.

Now, open app.module.ts class and write the below code.

```
import { BrowserModule } from '@angular/platform-browser';
import { NgModule } from '@angular/core';
import { EmployeeService } from './employee.service';
import { FormsModule, ReactiveFormsModule } from '@angular/forms';
import { HttpClientModule, HttpClient } from '@angular/common/http';
import {
  MatButtonModule, MatMenuModule, MatDatepickerModule,MatNativeDateModule
  MatInputModule, MatTooltipModule, MatToolbarModule
} from '@angular/material';
import { MatRadioModule } from '@angular/material/radio';
import { BrowserAnimationsModule } from '@angular/platform-browser
/animations';

import { AppRoutingModule } from './app-routing.module';
import { AppComponent } from './app.component';
import { EmployeeComponent } from './employee/employee.component';

@NgModule({
  declarations: [
    AppComponent,
    EmployeeComponent
  ],
  imports: [
    BrowserModule,
```

```
    MatButtonModule,
    MatMenuModule,
    MatDatepickerModule,
    MatNativeDateModule,
    MatIconModule,
    MatRadioModule,
    MatCardModule,
    MatSidenavModule,
    MatFormFieldModule,
    MatInputModule,
    MatTooltipModule,
    MatToolbarModule,
    AppRoutingModule
  ],
  providers: [HttpClientModule, EmployeeService,MatDatepickerModule],
  bootstrap: [AppComponent]
})
export class AppModule { }
```

Now, we have to import library in styles.css file.

```
@import '@angular/material/prebuilt-themes/indigo-pink.css';
```

Step 8. Design HTML

Let;s design our html page now.

Open employee.component.html and write the below code.

```
<div class="container">

<mat-card>
  <mat-toolbar color="accent">
    <div align="center" style="color:white;text-align: right;">
      CRUD operation in Angular 7 using Web api and Sql Database
    </div>
  </mat-toolbar>
<br><br>
  <mat-card-content>
    <form [formGroup]="employeeForm" (ngSubmit)="onFormSubmit(employeeForm.value)">
            <table>
              <tr>
                <td class="tbl1">
                  <mat-form-field class="demo-full-width">
                    <input formControlName="EmpName" matTooltip="Enter
                  </mat-form-field>
```

```
                </td>
                <td class="tbl1">
                  <mat-form-field class="demo-full-width">
                    <input matInput [matDatepicker]="picker"matTooltip="E
                    <mat-datepicker-toggle matSuffix [for]="picker">
</mat-datepicker-toggle>
                    <mat-datepicker #picker></mat-datepicker>
                  </mat-form-field>
                  <mat-error>
                    <span *ngIf="!employeeForm.get('DateOfBirth').value &
</span>
                  </mat-error>
                </td>
                <td class="tbl1">
                  <mat-form-field class="demo-full-width">
                    <input formControlName="EmailId" matTooltip="Enter Em
                  </mat-form-field>
                  <mat-error>
                    <span *ngIf="!employeeForm.get('EmailId').value && em
</span>
                  </mat-error>
                </td>
              </tr>
              <tr>
                <td class="tbl1">
                  <span>Gender</span>
                  <br><br>
                  <mat-radio-
group matTooltip="Enter Gender"formControlName="Gender">
                      <mat-radio-button value="0">Male</mat-radio-
button>
                      <mat-radio-button value="1">Female</mat-radio-
button>
                    </mat-radio-group>
                  <mat-error>
                    <span *ngIf="!employeeForm.get('Gender').value && emp
</span>
                  </mat-error>
                </td>
                <td class="tbl1">
                  <mat-form-field class="demo-full-width">
                    <input matTooltip="Enter Address"formControlName="Add
                  </mat-form-field>
                  <mat-error>
                    <span *ngIf="!employeeForm.get('Address').value && em
</span>
                  </mat-error>
                </td>
```

```
                  <mat-error>
                    <span *ngIf="!employeeForm.get('PinCode').value && em
</span>
                  </mat-error>
                </td>
              </tr>
              <tr>
                <td></td>
                <td  class="content-center">
                  <button type="submit" mat-raised-
button color="accent"matTooltip="Click Submit Button"
[disabled]="!employeeForm.valid">Submit</button>
                  <button type="reset" mat-raised-
button color="accent"matTooltip="Click Reset Button" (click)="resetForm()
                </td>
                <td>
                  <p *ngIf="dataSaved" style="color:rgb(0, 128, 0);font-
size:20px;font-weight:bold" Class="success" align="left">
                    {{massage}}
                  </p>
                </td>
              </tr>
            </table>
<br><br>
      <table class="table" >
          <tr ngclass="btn-primary">
            <th class="tbl2">Employee Name</th>
            <th class="tbl2">Date Of Birth</th>
            <th class="tbl2">Email Id</th>
            <th class="tbl2">Gender</th>
            <th class="tbl2">Address</th>
            <th class="tbl2">Pine Code</th>
            <th class="tbl2">Edit</th>
            <th class="tbl2">Delete</th>
          </tr>
          <tr *ngFor="let employee of allEmployees | async">
            <td class="tbl2">{{employee.EmpName}}</td>
            <td class="tbl2">{{employee.DateOfBirth | date }}</td>
            <td class="tbl2">{{employee.EmailId}}</td>
            <td class="tbl2">
{{employee.Gender ==0? 'Male' : 'Female'}}</td>
            <td class="tbl2">{{employee.Address}}</td>
            <td class="tbl2">{{employee.PinCode}}</td>
            <td class="tbl2">
              <button type="button" class="btn btn-
info"matTooltip="Click Edit Button"
(click)="loadEmployeeToEdit(employee.EmpId)">Edit</button>
            </td>
```

```
            </td>
          </tr>

        </table>
      </form>
    </mat-card-content>
  </mat-card>
  </div>
```

Step 9

Open app.component.html and write the below code.

```
<p>
  <app-employee></app-employee>
</p>
```

Step 10

Open employee.component.ts file and write the below code.

```
import { Component, OnInit } from '@angular/core';
import { FormBuilder, Validators } from '@angular/forms';
import { Observable } from 'rxjs';
import { EmployeeService } from '../employee.service';
import { Employee } from '../employee';

@Component({
  selector: 'app-employee',
  templateUrl: './employee.component.html',
  styleUrls: ['./employee.component.css']
})
export class EmployeeComponent implements OnInit {
  dataSaved = false;
  employeeForm: any;
  allEmployees: Observable<Employee[]>;
  employeeIdUpdate = null;
  massage = null;

  constructor(private formbulider: FormBuilder, private employeeService:E

  ngOnInit() {
    this.employeeForm = this.formbulider.group({
      EmpName: ['', [Validators.required]],
      DateOfBirth: ['', [Validators.required]],
      EmailId: ['', [Validators.required]],
      Gender: ['', [Validators.required]],
```

```
  }
  loadAllEmployees() {
    this.allEmployees = this.employeeService.getAllEmployee();
  }
  onFormSubmit() {
    this.dataSaved = false;
    const employee = this.employeeForm.value;
    this.CreateEmployee(employee);
    this.employeeForm.reset();
  }
  loadEmployeeToEdit(employeeId: string) {
    this.employeeService.getEmployeeById(employeeId).subscribe(employee=>
      this.massage = null;
      this.dataSaved = false;
      this.employeeIdUpdate = employee.EmpId;
      this.employeeForm.controls['EmpName'].setValue(employee.EmpName);
     this.employeeForm.controls['DateOfBirth'].setValue(employee.DateOfBi
      this.employeeForm.controls['EmailId'].setValue(employee.EmailId);
      this.employeeForm.controls['Gender'].setValue(employee.Gender);
      this.employeeForm.controls['Address'].setValue(employee.Address);
      this.employeeForm.controls['PinCode'].setValue(employee.PinCode);
    });

  }
  CreateEmployee(employee: Employee) {
    if (this.employeeIdUpdate == null) {
      this.employeeService.createEmployee(employee).subscribe(
        () => {
          this.dataSaved = true;
          this.massage = 'Record saved Successfully';
          this.loadAllEmployees();
          this.employeeIdUpdate = null;
          this.employeeForm.reset();
        }
      );
    } else {
      employee.EmpId = this.employeeIdUpdate;
      this.employeeService.updateEmployee(employee).subscribe(() => {
        this.dataSaved = true;
        this.massage = 'Record Updated Successfully';
        this.loadAllEmployees();
        this.employeeIdUpdate = null;
        this.employeeForm.reset();
      });
    }
  }
  deleteEmployee(employeeId: string) {
    if (confirm("Are you sure you want to delete this ?")) {
```

```
      this.employeeIdUpdate = null;
      this.employeeForm.reset();

    });
  }
}
  resetForm() {
    this.employeeForm.reset();
    this.massage = null;
    this.dataSaved = false;
  }
}
```

Step 11. Run

We have completed all needed code functionality for our CRUD operations. Before running the application, first make sure save your work.

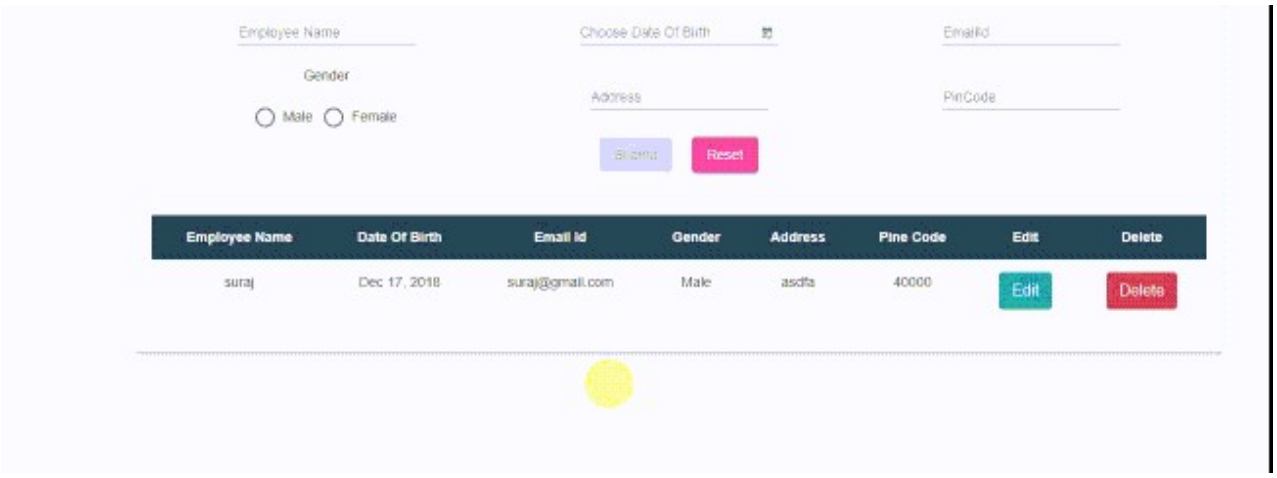
Now, let's run the app and see how it works.

Open TERMINAL and write the following command to run the program.

ng serve -o

The output looks like the following image. It's a stunning UI created with CRUD operations.

Fernando



Congratulations!

You've finished a completed Web app with CRUD functionality. The App uses a Web API to provide data access from a SQL Server.

Now, start playing with the app by adding, updating, and deleting data.

Thank you for reading my article.

Angular | CRUD Operation In Angular 7 | Database Of SQL Server | SQL Server | Web API In .NET

cus
Guid C# Corner

Fernando

381 **834.9k** **1**

View Previous Comments

32 **23**

Type your comment here and press Enter Key (Minimum 10 characters)

Follow Comments

Fyi there are a couple of errors you will get if the database table is not setup correctly. System.Data.Entity.Core.OptimisticConcurrencyException and Cannot insert the value NULL into column column does not allow nulls insert failsyou need to create the table using the following script. CREATE TABLE EmployeeDetails (EmpId INT PRIMARY KEY IDENTITY(1,1), EmpName VARCHAR(50) , DateOfBirth DATE, EmailId VARCHAR(50), Gender NCHAR(10), Address VARCHAR(100), PinCode VARCHAR(50))

derek rock Apr 12, 2019

1759 **19** **0** 0 0 Reply

Hi Mithilesh. Great tutorial, Getting a SqlException: Cannot insert the value NULL into column 'EmpId', table 'Test.dbo.EmployeeDetails'; column does not allow nulls. This does not happen on update, only insert. Any ideas? Thank You in Advance!

derek rock Apr 11, 2019

1759 **19** **0** 0 1 Reply

Hi rock in this example i set primary key autoincrement in sql table so no need to insert of empid because empi is primary key so i think you did not set primary key identity

Mithilesh Kumar Apr 13, 2019

381 **4.6k** **834.9k** 0

Nice....thankyou sir..

Nayeem Mansoori Apr 03, 2019

1623 **155** **5k** 1 0 Reply

Good explanation for CRUD.....

Hamid Khan Mar 20, 2019

587 **2.4k** **187.7k** 0 1 Reply

Thank you Hamid for valuable feedback....

Mithilesh Kumar Mar 20, 2019

381 **4.6k** **834.9k**

cus
Guid C# Corner

Fernando

Thank you Ibrahim...For debugger tool you can use Augury you get more details this link https://augury.rangle.io/

Mithilesh Kumar Mar 20, 2019

381 4.6k 834.9k 1

How to get value from mat-radio-button tag after clicking getEmployeeById()

NTDP Murthy Mar 04, 2019

1759 19 0 0 1 Reply

You send the parameter in getEmployeeById() method in ts file like getEmployeeById(value){ console.log(" Value is : ", value);}

Mithilesh Kumar Mar 04, 2019

381 4.6k 834.9k 1

Would you happen to know why the imported material theme does not apply to the table?

Jacob Mar 01, 2019

1776 2 0 1 1 Reply

Thank you I used here only them on page and also applied on the fields. I used table only set the alignment or you can use without table..

Mithilesh Kumar Mar 01, 2019

381 4.6k 834.9k 0

Import { Lancamento } from './lancamento.model';Export class Employee { EmpId: string; EmpName: string; DateOfBirth: Date; EmailId: string; Gender: string; Address: string; PinCode: string; public lancamentos?: Lancamento[], } what would a combobox look like if it had a relationship?

Junior Ferreira Feb 21, 2019

1771 7 0 0 1 Reply

Can you explain in more clear ?...

Mithilesh Kumar Feb 21, 2019

381 4.6k 834.9k 0

Nice! but can you provide scrolling functionality to this table.

Somnath Agwan Feb 12, 2019

1744 34 0 0 0 Reply

Please give an example with login functionality also

Uma Pl Feb 07, 2019

1449 329 242 1 1 Reply

Sure..I will post in later article ...

Mithilesh Kumar Feb 07

cus
Guid C# Corner

Fernando