Evidence Exam: ASP.NET Core MVC with view component Master Details CRUD Operation in a Signal Page

Project Name: Product Master Details CRUD

Explanation:

- 1. ASP.NET Core Web App (Model View Controller)
- 2. View Component
- 3. Master Details
- 4. CRUD Operation
- 5. Signal Page

Step 1: Creating the ASP.NET Core MVC Project

• A new ASP.NET Core Web Application (MVC) is created.

Step 2: Installing Required NuGet Packages

```
    Microsoft.EntityFrameworkCore.SqlServer
    Microsoft.EntityFrameworkCore.Tools
    EntityFrameWork.Core
    Microsoft.EntityFrameworkCore.Design
    Microsoft.VisualStudio.Web.CodeGeneration.Design
    jQuery
```

Step 3: Database Configuration (appsettings.json)

• Connection Strings are added to connect to SQL Server or LocalDB.

```
//Localdb
"AllowedHosts": "*",

"ConnectionStrings": {
    "appCon": "Data Source=(localdb)\\MSSQLLocalDB;Initial
    Catalog=PrductMasterDetails_CRUD_DB;Integrated Security=True;Connect Timeout=30;Encrypt=False;Trust
    Server Certificate=False;Application Intent=ReadWrite;Multi Subnet Failover=False"
    }
}
//Or sql
"AllowedHosts": "*", "ConnectionStrings": { "EmployeeDB": "Server=
    DESKTOPES8G333;Database=DatabseName; Trusted_Connection=True;
MultipleActiveResultSets=True;" }

For Password:
```

"ConnectionStrings": { "DefaultConnection": "Server=EnterServerName; Database=DatabaseName; User Id=sa; Password=EnterPassword; Trusted_Connection=True; MultipleActiveResultSets=true" },

Step 4: Creating Models

Product.cs: using System.ComponentModel.DataAnnotations; using System.ComponentModel.DataAnnotations.Schema; namespace ProductMatarDetails_CRUD.Models public class Product [Key, DatabaseGenerated(DatabaseGeneratedOption.Identity)] public int PId { get; set; } public string PName { get; set; } public int Price { get; set; } public string? PImage { get; set; } public int Quantity { get; set; } public DateTime PDate { get; set; } public bool IsAvailable { get; set; } public virtual IList<Details>? Details { get; set; } } } Category.cs: using System.ComponentModel.DataAnnotations; using System.ComponentModel.DataAnnotations.Schema; namespace ProductMatarDetails_CRUD.Models public class Category [Key, DatabaseGenerated(DatabaseGeneratedOption.Identity)] public int CId { get; set; } public string CName { get; set; } public virtual IList<Details>? Details { get; set; } } Details.cs: using System.ComponentModel.DataAnnotations; using System.ComponentModel.DataAnnotations.Schema; namespace ProductMatarDetails_CRUD.Models public class Details

```
[Key, DatabaseGenerated(DatabaseGeneratedOption.Identity)]
public int DId { get; set; }
[ForeignKey("Product")]
public int PId { get; set; }
[ForeignKey("Category")]
public int CId { get; set; }

public virtual Product? Product { get; set; }

public virtual Category? Category { get; set; }
}
}
```

Step 5: VModel under the Models Folder

VModel.cs

```
namespace ProductMatarDetails_CRUD.Models.VModel
{
    public class VModel
    {
        public VModel()
        {
            this.Details = new List<Details>();
        }
        public int PId { get; set; }
        public string PName { get; set; }
        public int Price { get; set; }
        public string? PImage { get; set; }
        public IFormFile? ImageFile { get; set; }
        public int Quantity { get; set; }
        public DateTime PDate { get; set; }
        public bool IsAvailable { get; set; }
        public virtual List<Details>? Details { get; set; }
}
```

Step 6: Data Folder under the Project

ProductDbContext.cs

```
using Microsoft.EntityFrameworkCore;
using ProductMatarDetails_CRUD.Models;

namespace ProductMatarDetails_CRUD.Data
{
   public class ProductDbContext:DbContext
        {
        public ProductDbContext(DbContextOptions<ProductDbContext>options) :
        base(options)
```

```
    public DbSet<Product> Products { get; set; }
    public DbSet<Category> Categories { get; set; }
    public DbSet<Details> Details { get; set; }
}

Step 7: Registering DbContext in Program.cs -5

var CString = builder.Configuration.GetConnectionString("appCon");
builder.Services.AddDbContext<ProductDbContext>(opt => {
        opt.UseSqlServer(CString);
});

Change the ControllerRoute,
Home to Product
```

Step 8: Database Migration

• Using Package Manager Console (PMC):

```
add-migration "ScriptA"
update-database

After that Input some category in the Category Table
```

Step 9: ProductController

```
public async Task<ActionResult> Index()
            var products = await _context.Products.ToListAsync();
            return View(products);
        }
        public IActionResult Details(int id)
            var product = _context.Products
                .Include(p => p.Details)
                .ThenInclude(d => d.Category)
                .FirstOrDefault(p => p.PId == id);
            if (product == null)
                return NotFound();
            return PartialView("Details", product);
            //return View(product);
        }
        public IActionResult Create()
            // Load categories for dropdown
            ViewBag.Categories = new SelectList(_context.Categories, "CId",
"CName"):
            return PartialView("Create");
            //return View();
        }
        [HttpPost]
        [ValidateAntiForgeryToken]
        public async Task<IActionResult> Create(VModel vModel, int[] CId)
            if (ModelState.IsValid)
            {
                Product product = new Product
                {
                    PName = vModel.PName,
                    PDate = vModel.PDate,
                    IsAvailable = vModel.IsAvailable,
                    Price = vModel.Price,
                    Quantity = vModel.Quantity,
                };
                if (vModel.ImageFile != null)
                    var file = DateTime.Now.Ticks.ToString() +
Path.GetExtension(vModel.ImageFile.FileName);
                    var fileName = _env.WebRootPath + "/Images/" + file;
                    using (var stream = System.IO.File.Create(fileName))
                        await vModel.ImageFile.CopyToAsync(stream);
                    }
                    product.PImage = "/Images/" + file;
                }
```

```
_context.Add(product);
                await _context.SaveChangesAsync();
                if (CId != null && CId.Length > 0)
                    foreach (var cId in CId.Where(id => id > 0))
                        Details details = new Details
                        {
                            PId = product.PId,
                            CId = cId
                        };
                        _context.Add(details);
                    await _context.SaveChangesAsync();
                }
                return RedirectToAction(nameof(Index));
            }
            // If we got this far, something failed, reload categories
            ViewBag.Categories = new SelectList(_context.Categories, "CId",
"CName");
            return View(vModel);
        }
        public IActionResult Edit(int id)
            var product = _context.Products
                .Include(p => p.Details)
                .FirstOrDefault(p => p.PId == id);
            if (product == null)
                return NotFound();
            }
            VModel vModel = new VModel
            {
                PId = product.PId,
                PName = product.PName,
                PDate = product.PDate,
                IsAvailable = product.IsAvailable,
                Price = product.Price,
                Quantity = product.Quantity,
                PImage = product.PImage
            };
            // Load categories for dropdown
            ViewBag.Categories = new SelectList(_context.Categories, "CId",
"CName"):
            ViewBag.SelectedCategories = product.Details.Select(d =>
d.CId).ToList();
            return PartialView("Edit", vModel);
```

```
//return View(vModel);
        }
        [HttpPost]
        [ValidateAntiForgeryToken]
        public async Task<IActionResult> Edit(int id, VModel vModel, int[] CId)
            if (id != vModel.PId)
            {
                return NotFound();
            }
            if (ModelState.IsValid)
                try
                {
                    var product = await _context.Products.FindAsync(id);
                    if (product == null)
                        return NotFound();
                    }
                    product.PName = vModel.PName;
                    product.PDate = vModel.PDate;
                    product.IsAvailable = vModel.IsAvailable;
                    product.Price = vModel.Price;
                    product.Quantity = vModel.Quantity;
                    if (vModel.ImageFile != null)
                        var file = DateTime.Now.Ticks.ToString() +
Path.GetExtension(vModel.ImageFile.FileName);
                        var fileName = _env.WebRootPath + "/Images/" + file;
                        using (var stream = System.IO.File.Create(fileName))
                            await vModel.ImageFile.CopyToAsync(stream);
                        }
                        // Delete old image if exists
                        if (!string.IsNullOrEmpty(product.PImage))
                            var oldImagePath = _env.WebRootPath + product.PImage;
                            if (System.IO.File.Exists(oldImagePath))
                                System.IO.File.Delete(oldImagePath);
                            }
                        }
                        product.PImage = "/Images/" + file;
                    }
                    // Update categories
                    var existingDetails = _context.Details.Where(d => d.PId ==
id).ToList();
                    _context.Details.RemoveRange(existingDetails);
                    if (CId != null && CId.Length > 0)
```

```
foreach (var cId in CId.Where(cid => cid > 0))
                            Details details = new Details
                             {
                                PId = product.PId,
                                CId = cId
                            };
                            _context.Add(details);
                        }
                    }
                    _context.Update(product);
                    await _context.SaveChangesAsync();
                    return RedirectToAction(nameof(Index));
                }
                catch (DbUpdateConcurrencyException)
                    if (!ProductExists(vModel.PId))
                    {
                        return NotFound();
                    }
                    else
                        throw;
                    }
                }
            }
            // If we got this far, something failed, reload categories
            ViewBag.Categories = new SelectList(_context.Categories, "CId",
"CName"):
            ViewBag.SelectedCategories = _context.Details.Where(d => d.PId ==
id).Select(d => d.CId).ToList();
            return View(vModel);
        }
        [HttpPost]
        [ValidateAntiForgeryToken]
        public async Task<IActionResult> Delete(int id)
            var product = await _context.Products
                .Include(p => p.Details)
                .FirstOrDefaultAsync(p => p.PId == id);
            if (product == null)
                return NotFound();
            }
            // Delete image if exists
            if (!string.IsNullOrEmpty(product.PImage))
                var imagePath = _env.WebRootPath + product.PImage;
                if (System.IO.File.Exists(imagePath))
                {
                    System.IO.File.Delete(imagePath);
                }
```

```
    _context.Products.Remove(product);
    await _context.SaveChangesAsync();

    return RedirectToAction(nameof(Index));
}

public IActionResult AddCategory(int index)
{
    ViewBag.Categories = new SelectList(_context.Categories, "CId",
    return ViewComponent("CategoryManagement", new { index = index });
}

private bool ProductExists(int id)
{
    return _context.Products.Any(e => e.PId == id);
}
}
```

Step 10: Index View (Index.cshtml)

```
@model IEnumerable<ProductMatarDetails_CRUD.Models.Product>
<h1 class="text-center">Product List</h1>
>
  <a asp-action="Create" class="btn btn-primary crBtn">Create New</a>
@if (Model.Any())
  <thead>
        Product Name
           Price
           Image
           Quantity
           Date
           Available
           Actions
        </thead>
     @foreach (var item in Model)
```

```
@item.PName
                   @item.Price
                   @if (!string.IsNullOrEmpty(item.PImage))
                           <img src="@item.PImage" class="rounded-circle"</pre>
alt="@item.PName" style="max-width: 60px; max-height: 60px;" />
                       }
                   @item.Quantity
                   @item.PDate.ToShortDateString()
                   @(item.IsAvailable ? "Yes" : "No")
                   <button class="btn btn-warning detailsBtn" type="button"</pre>
data-id="@item.PId">
                           Details
                       </button>
                       <button class="btn btn-warning editBtn" type="button" data-</pre>
id="@item.PId">
                           Edit
                       </button>
                       <form asp-action="Delete" asp-route-id="@item.PId"</pre>
method="post" style="display:inline">
                           <button type="submit" class="btn btn-danger btn-sm"</pre>
onclick="return confirm('Are you sure you want to delete this item?');">
                               Delete
                           </button>
                       </form>
                   }
       }
else
{
   <div class="alert alert-info">No products available.</div>
}
<section class="mcon" style="display:none;">
   <div class="mbod p-5">
       <div class="macon"></div>
       <div class="modal-footer">
           <button class="btn btn-danger clbtn">Close</button>
       </div>
   </div>
</section>
Step 11: Details Views
Details.cshtml
@model ProductMatarDetails_CRUD.Models.Product
<div class="container mt-4">
   <h1 class="text-center">Product Details</h1>
   <div class="row">
```

```
<div class="col-md-6">
          <div class="card">
              <div class="card-header">
                 <h4>@Model.PName</h4>
              <div class="card-body">
                 @if (!string.IsNullOrEmpty(Model.PImage))
                     <img src="@Model.PImage" class="img-fluid mb-3"</pre>
alt="@Model.PName" />
                 }
                 Price
                        @Model.Price
                     Quantity
                        @Model.Quantity
                     Date
                        @Model.PDate.ToShortDateString()
                     Available
                        @(Model.IsAvailable ? "Yes" : "No")
                     </div>
          </div>
       </div>
       <div class="col-md-6">
          <div class="card">
              <div class="card-header">
                 <h4>Categories</h4>
              </div>
              <div class="card-body">
                 @await Component.InvokeAsync("CategoryManagement", new {
productId = Model.PId, mode = "display" })
              </div>
          </div>
       </div>
   </div>
   <div class="mt-3">
       <a asp-action="Edit" asp-route-id="@Model.PId" class="btn btn-</pre>
primary">Edit</a>
       <a asp-action="Index" class="btn btn-secondary">Back to List</a>
   </div>
</div>
```

Step 12: Create Views

```
@model ProductMatarDetails_CRUD.Models.VModel.VModel
<h4 class="text-center">Create Product</h4>
<hr />
<div class="row">
    <div class="col-md-12">
        <form asp-action="Create" method="post" enctype="multipart/form-data">
            <div asp-validation-summary="ModelOnly" class="text-danger"></div>
            <div class="form-group">
                <label asp-for="PName" class="control-label"></label>
                <input asp-for="PName" class="form-control" />
                <span asp-validation-for="PName" class="text-danger"></span>
            </div>
            <div class="form-group">
                <label asp-for="Price" class="control-label"></label>
                <input asp-for="Price" class="form-control" />
                <span asp-validation-for="Price" class="text-danger"></span>
            </div>
            <div class="form-group">
                <label asp-for="ImageFile" class="control-label"></label>
                <input asp-for="ImageFile" class="form-control" type="file" />
                <span asp-validation-for="ImageFile" class="text-danger"></span>
            <div class="form-group">
                <label asp-for="Quantity" class="control-label"></label>
                <input asp-for="Quantity" class="form-control" />
                <span asp-validation-for="Quantity" class="text-danger"></span>
            </div>
            <div class="form-group">
                <label asp-for="PDate" class="control-label"></label>
                <input asp-for="PDate" class="form-control" type="date" />
                <span asp-validation-for="PDate" class="text-danger"></span>
            </div>
            <div class="form-group form-check">
                <label class="form-check-label">
                    <input class="form-check-input" asp-for="IsAvailable" />
                    @Html.DisplayNameFor(model => model.IsAvailable)
                </label>
            </div>
            <div class="my-3">
                <h5>Product Categories</h5>
                <hr />
                <div>
                    <button type="button" class="btn btn-info addMore">
                        Add Category
                    </button>
                </div>
                <div class="categories-container mt-2">
                    @await Component.InvokeAsync("CategoryManagement",                          new { mode =
"create", index = 0 })
                </div>
            </div>
            <div class="form-group mt-3">
                <input type="submit" value="Create" class="btn btn-primary" />
                <a asp-action="Index" class="btn btn-secondary">Back to List</a>
            </div>
        </form>
```

```
</div>
</div>
<script>
    $(document).ready(() => {
        var index = 1;
        $(".addMore").click(() => {
             $.ajax({
                 url: "/Product/AddCategory",
                 type: "get",
                 data: { index: index },
                 success: (d) \Longrightarrow {
                     $(".categories-container").append(d);
                     index++;
                 },
            });
        });
    });
    $(document).on("click", ".remove", (e) => {
        $(e.currentTarget).closest(".rc").remove();
    });
</script>
```

Step 13: Create Views

Edit.cshtml

```
@model ProductMatarDetails_CRUD.Models.VModel.VModel
<h4 class="text-center">Edit Product</h4>
<hr />
<div class="row">
    <div class="col-md-12">
        <form asp-action="Edit" method="post" enctype="multipart/form-data">
            <div asp-validation-summary="ModelOnly" class="text-danger"></div>
            <input type="hidden" asp-for="PId" />
            <input type="hidden" asp-for="PImage" />
            <div class="form-group">
                <label asp-for="PName" class="control-label"></label>
                <input asp-for="PName" class="form-control" />
                <span asp-validation-for="PName" class="text-danger"></span>
            </div>
            <div class="form-group">
                <label asp-for="Price" class="control-label"></label>
                <input asp-for="Price" class="form-control" />
                <span asp-validation-for="Price" class="text-danger"></span>
            </div>
            <div class="form-group">
                <label asp-for="ImageFile" class="control-label"></label>
                <input asp-for="ImageFile" class="form-control" type="file" />
                <span asp-validation-for="ImageFile" class="text-danger"></span>
            </div>
```

```
@if (!string.IsNullOrEmpty(Model.PImage))
                <div class="form-group">
                    <label>Current Image</label>
                    <div>
                        <img src="@Model.PImage" class="rounded-circle" style="max-</pre>
width: 200px; max-height: 200px;" />
                    </div>
                </div>
            }
            <div class="form-group">
                <label asp-for="Quantity" class="control-label"></label>
                <input asp-for="Quantity" class="form-control" />
                <span asp-validation-for="Quantity" class="text-danger"></span>
            </div>
            <div class="form-group">
                <label asp-for="PDate" class="control-label"></label>
                <input asp-for="PDate" class="form-control" type="date" />
                <span asp-validation-for="PDate" class="text-danger"></span>
            <div class="form-group form-check">
                <label class="form-check-label">
                    <input class="form-check-input" asp-for="IsAvailable" />
                    @Html.DisplayNameFor(model => model.IsAvailable)
                </label>
            </div>
            <div class="my-3">
                <h5>Product Categories</h5>
                <hr />
                <div>
                    <button type="button" class="btn btn-info addMore">
                        Add Category
                    </button>
                </div>
                <div class="categories-container mt-2">
                    @{
                        var selectedCategories = ViewBag.SelectedCategories as
List<int> ?? new List<int>();
                        for (int i = 0; i < selectedCategories.Count; i++)</pre>
                            @await Component.InvokeAsync("CategoryManagement", new {
productId = Model.PId, mode = "edit", index = i })
                        if (selectedCategories.Count == 0)
                            @await Component.InvokeAsync("CategoryManagement", new {
mode = "create", index = 0 })
                    }
                </div>
            </div>
            <div class="form-group mt-3">
                <input type="submit" value="Save" class="btn btn-primary" />
```

```
<a asp-action="Index" class="btn btn-secondary">Back to List</a>
            </div>
        </form>
    </div>
</div>
<script>
       $(document).ready(() => {
        var index = @(ViewBag.SelectedCategories != null ?
((List<int>)ViewBag.SelectedCategories).Count : 1);
        // Add more categories
        $(".addMore").click(() => {
            $.ajax({
                url: "/Product/AddCategory",
                type: "get",
                data: { index: index },
                success: (d) => {
                    $(".categories-container").append(d);
                },
            });
        });
        // Initialize selected category values (if in edit mode)
        if ($(".categories-container select").length > 0) {
            // This will be handled by the inline script in each CategoryManagement
component
            // No additional code needed here
    });
    // Remove category item
    $(document).on("click", ".remove", (e) => {
        $(e.currentTarget).closest(".rc").remove();
    });
</script>
```

Step 14: ViewComponent folder under the Project

```
Category Management View Component.cs\\
```

```
using Microsoft.AspNetCore.Mvc.Rendering;
using Microsoft.AspNetCore.Mvc;
using ProductMatarDetails_CRUD.Data;
using ProductMatarDetails_CRUD.Models;
using Microsoft.EntityFrameworkCore;

namespace ProductMatarDetails_CRUD.ViewComponents
{
    public class CategoryManagementViewComponent : ViewComponent
```

```
private readonly ProductDbContext _context;
        public CategoryManagementViewComponent(ProductDbContext context)
            _context = context;
        }
        public IViewComponentResult Invoke(int? productId = null, string mode =
"create", int index = 0)
{
            // Get all categories as SelectList
            var categories = new SelectList(_context.Categories, "CId", "CName");
            ViewBag.Categories = categories;
            ViewBag.Index = index;
            ViewBag.Mode = mode;
            // If in display mode and productId is provided, get selected categories
            if (mode == "display" && productId.HasValue)
            {
                var productCategories = _context.Details
                    .Include(d => d.Category)
                    .Where(d => d.PId == productId.Value)
                    .Select(d => d.Category)
                    .ToList();
                return View(productCategories);
            }
            // If in edit mode and productId is provided, get selected category ids
            else if (mode == "edit" && productId.HasValue)
            {
                var selectedCategoryIds = _context.Details
                    .Where(d => d.PId == productId.Value)
                    .Select(d => d.CId)
                    .ToList();
                ViewBag.SelectedCategories = selectedCategoryIds;
                return View(new List<Category>());
            }
            return View(new List<Category>());
        }
    }
}
```

Step 15: Components Folder Under the Shared Folder

CategoryManagement Folder under the Components Folder

Default.cshtml

```
@model IEnumerable<ProductMatarDetails_CRUD.Models.Category>
@{
    var index = ViewBag.Index;
    var mode = ViewBag.Mode;
```

```
var categories = ViewBag.Categories as SelectList;
   var selectedCategories = ViewBag.SelectedCategories as List<int> ?? new
List<int>();
}
@if (mode == "display")
   <div class="categories-list">
       @if (Model.Any())
           <thead>
                  Category Id
                      Category Name
                  </thead>
               @foreach (var category in Model)
                      @category.CId
                          @category.CName
                      }
               }
       else
       {
           <span>No Categories Available</span>
       }
   </div>
}
else
   <div class="rc my-2 d-flex">
       @if (mode == "edit" && index < selectedCategories.Count)</pre>
       {
           <select name="CId" class="form-control" asp-items="categories">
               <option value="">Select Category</option>
           </select>
       }
       else
       {
           <select name="CId" class="form-control" asp-items="categories">
               <option value="">Select Category</option>
           </select>
       }
       <button type="button" class="btn btn-danger remove ms-2">Remove</button>
   </div>
   @if (mode == "edit" && index < selectedCategories.Count)</pre>
       <script>
           $(document).ready(function() {
               // Use jQuery to set the selected value for this specific dropdown
               $(".categories-container
.rc").eq(@index).find("select[name='CId']").val('@selectedCategories[index]');
```

```
});
</script>
}
```

Step 16: Layout.cshtml

In the Head Section:

```
<script src="~/lib/jquery/dist/jquery.min.js"></script>
    <script src="~/lib/jquery/dist/jquery.js"></script>
    <style>
        .mcon {
            width: 100vw;
            height: 100vh;
            background-color: rgba(0,0,0,.2);
            position: fixed;
            top: 0;
            left: 0;
            display: flex;
            justify-content: center;
            align-items: center;
            z-index: 1000;
        }
        .mbod {
            width: 50%;
            max-height: 80vh;
            background-color: #fff;
            overflow: scroll;
            scrollbar-width: none;
    </style>
Header Change to Product
End of the Body Section (After Footer)
    <script>
        $(document).ready(() => {
            // Create Button Click
            $(".crBtn").click((e) => {
                 e.preventDefault();
                 $.ajax({
                     url: "/Product/Create",
                     type: "get"
                     success: (d) \Longrightarrow {
                         $(".macon").html(d);
```

```
$(".mcon").show();
                }
            });
        });
        // Edit Button Click (use class selector)
        $(document).on("click", ".editBtn", (e) => {
            e.preventDefault();
            var id = $(e.currentTarget).data("id");
            console.log(id);
            $.ajax({
                 url: "/Product/Edit/" + id,
                 type: "get",
                 success: (d) => {
                     $(".macon").html(d);
                     $(".mcon").show();
                 }
            });
        });
        // Remove Button Click (Dynamic)
        $(document).on("click", ".remove", (e) => {
    e.preventDefault();
            $(e.currentTarget).closest(".rc").remove();
        });
        // Edit Button Click (use class selector)
        $(document).on("click", ".detailsBtn", (e) => {
            e.preventDefault();
            var id = $(e.currentTarget).data("id");
            console.log(id);
            $.ajax({
                 url: "Product/Details/" + id,
                 type: "get",
                 success: (d) \Rightarrow {
                     $(".macon").html(d);
                     $(".mcon").show();
                 }
            });
        });
        // Close Button Click
        $(".clbtn").click(() => {
            $(".mcon").hide();
        });
    });
</script>
```