

Genovation AI - Back-End Developer Assignment: Task Management System API Form

Logging, Validation, Robust Testing

Project files source code: <https://github.com/hamdi-4u/TaskManagerAPI.git>

How to Use

dotnet run

Login Cookie Authentication

Testing in Postman with Cookies

Setup:

1. Go to **POST** /api/auth/login
2. Body:
json

```
{  
  "username": "user",  
  "password": "user123"  
}
```
3. Send request
4. Cookie is **automatically saved** by Postman

Test Retrieve:

1. Go to **GET** /api/tasks/1
2. Cookie is **automatically sent**
3. Check response (200 OK if task belongs to user, 403 if not)

Testing in Swagger

Login Cookie Authentication

1. Navigate to <https://localhost:7198/swagger/index.html>
2. Find **POST /api/auth/login**
3. Click "Try it out"
4. Enter:

json
{
 "username": "user",
 "password": "user123"
}
5. Execute
6. Cookie is set in browser automatically

Test Endpoints

test all protected endpoints!

API Endpoints

Authentication

Users (Admin only)

| Method | Endpoint | Description |
|---------------|-----------------|--------------------|
|---------------|-----------------|--------------------|

| | | |
|-----|------------|---------------|
| GET | /api/users | Get all users |
|-----|------------|---------------|

| | | |
|-----|-----------------|----------------|
| GET | /api/users/{id} | Get user by ID |
|-----|-----------------|----------------|

| | | |
|------|------------|-----------------|
| POST | /api/users | Create new user |
|------|------------|-----------------|

| | | |
|-----|-----------------|-------------|
| PUT | /api/users/{id} | Update user |
|-----|-----------------|-------------|

| | | |
|--------|-----------------|-------------|
| DELETE | /api/users/{id} | Delete user |
|--------|-----------------|-------------|

Tasks

| Method | Endpoint | Auth | Description |
|---------------|-----------------|-------------|--------------------|
|---------------|-----------------|-------------|--------------------|

| | | | |
|-----|------------|-----------|------------------------------|
| GET | /api/tasks | All users | Get tasks (filtered by role) |
|-----|------------|-----------|------------------------------|

| | | | |
|-----|-----------------|-----------|----------------|
| GET | /api/tasks/{id} | All users | Get task by ID |
|-----|-----------------|-----------|----------------|

| | | | |
|------|------------|------------|-----------------|
| POST | /api/tasks | Admin only | Create new task |
|------|------------|------------|-----------------|

| | | | |
|-----|-----------------|-----------|--------------|
| PUT | /api/tasks/{id} | All users | Update task* |
|-----|-----------------|-----------|--------------|

| | | | |
|--------|-----------------|------------|-------------|
| DELETE | /api/tasks/{id} | Admin only | Delete task |
|--------|-----------------|------------|-------------|

Admin can update all fields, Users can only update status of their own tasks.

Users Controller:

- POST /api/users → Creates new user dynamically
- GET /api/users → Returns seed data + any new users created
- PUT /api/users/{id} → Updates user (Admin only)
- DELETE /api/users/{id} → Deletes user (Admin only)

Tasks Controller:

- POST /api/tasks → Creates new task dynamically (Admin only)
- GET /api/tasks → Returns all tasks (Admin) or user's tasks (User)
- PUT /api/tasks/{id} → Updates task dynamically
- DELETE /api/tasks/{id} → Deletes task (Admin only)

Configuration

appsettings.json:

```
{  
  "Authentication": {  
    "Cookie": {  
      "LoginPath": "/api/auth/login",  
      "LogoutPath": "/api/auth/logout",  
      "ExpireTimeMinutes": 120,  
      "SlidingExpiration": true  
    }  
  },  
  "Logging": {  
    "LogLevel": {  
      "Default": "Information",  
      "Microsoft.AspNetCore": "Warning"  
    }  
  },  
  "AllowedHosts": "*"  
}
```

Database

Type: In-Memory Database (EF Core)

- Data persists during runtime
- Resets on application restart
- Pre-seeded with 2 users and 3 tasks

Entities:

- Users (Id, Username, Email, PasswordHash, Role, CreatedAt)
- Tasks (Id, Title, Description, Status, AssignedUserId, DueDate, CreatedAt)

Technologies Used

- **Framework:** .NET 8
- **ORM:** Entity Framework Core (In-Memory)
- **Authentication:** Cookie Authentication
- **Password Hashing:** BCrypt
- **API Documentation:** Swagger/OpenAPI
- **Testing:** xUnit + Moq

Example Requests

1. Login

```
curl -X POST https://localhost:7198/api/auth/login \
-H "Content-Type: application/json" \
-d '{"username":"admin","password":"admin123"}' \
-c cookies.txt
```

Note: -c cookies.txt saves the authentication cookie

2. Get All Tasks (Admin) - Using Cookie

```
curl -X GET https://localhost:7198/api/tasks \
-b cookies.txt
```

Note: -b cookies.txt sends the saved cookie

3. Create Task (Admin) - Using Cookie

```
curl -X POST https://localhost:5001/api/tasks \
-b cookies.txt \
-H "Content-Type: application/json" \
-d '{
    "title": "New Task",
    "description": "Task description",
    "assignedUserId": 2,
    "status": 0
}'
```

4. Update Task Status (User) - Using Cookie

```
curl -X PUT https://localhost:7198/api/tasks/1 \
-b cookies.txt \
-H "Content-Type: application/json" \
-d '{"status": 2}'
```

5. Logout

```
curl -X POST https://localhost:7198/api/auth/logout \
-b cookies.txt
```

Retrieve a Task

Scenario 1: Admin Views Any Task

Admin can view **any task** in the system.

```
# First, login as admin and save cookie
```

```
curl -X POST https://localhost:7198/api/auth/login \
-H "Content-Type: application/json" \
-d '{"username":"admin","password":"admin123"}' \
-c cookies.txt
```

```
# Then, retrieve task with ID 1 (works for any task)
```

```
curl -X GET https://localhost:7198/api/tasks/1 \
-b cookies.txt
```

Response (200 OK):

```
json
{
  "id": 1,
  "title": "Setup project",
  "description": "Initial setup and configuration",
  "status": "Pending",
  "dueDate": "2026-01-15T00:00:00Z",
  "createdAt": "2026-01-08T00:00:00Z",
  "assignedUserId": 2,
  "assignedUserName": "user",
  "assignedUserEmail": "user@example.com"
}
```

Scenario 2: User Views Their Own Task

Regular user can only view tasks **assigned to them**.

```
# Login as regular user and save cookie
```

```
curl -X POST https://localhost:7198/api/auth/login \
-H "Content-Type: application/json" \
-d '{"username":"user","password":"user123"}' \
-c user-cookies.txt
```

```
# Retrieve task assigned to this user (e.g., task ID 1)
```

```
curl -X GET https://localhost:7198/api/tasks/1 \
```

```
-b user-cookies.txt
```

Response (200 OK):

```
json
{
  "id": 1,
  "title": "Setup project",
  "description": "Initial setup and configuration",
  "status": "Pending",
  "dueDate": "2026-01-15T00:00:00Z",
  "createdAt": "2026-01-08T00:00:00Z",
  "assignedUserId": 2,
  "assignedUserName": "user",
  "assignedUserEmail": "user@example.com"
}
```

Scenario 3: User Tries to View Another User's Task

Regular user tries to view a task **NOT assigned to them**.

```
# Login as user (ID = 2)
curl -X POST https://localhost:7198/api/auth/login \
-H "Content-Type: application/json" \
-d '{"username":"user","password":"user123"}' \
-c user-cookies.txt

# Try to view task assigned to someone else (e.g., task ID 3 assigned to admin)
curl -X GET https://localhost:7198/api/tasks/3 \
-b user-cookies.txt
```

Response (403 Forbidden):

```
json
{
  "message": "You can only view your own tasks"
}
```

Scenario 4: Retrieve Non-Existent Task

```
# Try to get task that doesn't exist
curl -X GET https://localhost:7198/api/tasks/999 \
-b cookies.txt
```

Response (404 Not Found):

```
json
{
  "message": "Task not found"
}
```

Troubleshooting

Issue: "401 Unauthorized" on all requests

1. **Solution:** Make sure you've logged in and used the token in Authorization header
 2. **Issue:** Swagger not loading
 3. **Solution:** Ensure you're in Development mode and navigate to /swagger
 4. **Issue:** "Username already exists"
 5. **Solution:** Use different username or restart application to reset database
-

Project Architecture / Repository and Unit of Work

| |
|--|
| Controllers / API endpoints and HTTP handling |
| AuthController.cs |
| UsersController.cs |
| TasksController.cs |

| |
|--|
| Models // DTOs for API requests/responses |
| LoginRequest.cs |
| LoginResponse.cs |
| UserDto.cs |
| CreateUserDto.cs |
| TaskDto.cs |
| CreateTaskDto.cs |
| UpdateUserDto.cs |
| UpdateTaskDto.cs |

| |
|---|
| Entities // Database models (EF Core entities) |
| User.cs |
| TaskItem.cs |
| Role.cs |
| TaskStatus.cs |

| |
|---|
| Services // Business logic layer |
| AuthService.cs |
| IUserService.cs |
| UserService.cs |
| ITaskService.cs |
| TaskService.cs |

| |
|--|
| Repositories // Data access layer |
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| |
|--------------------|
| UserRepository.cs |
| IUserRepository.cs |
| ITaskRepository.cs |
| TaskRepository.cs |

| |
|---|
| Data // EF Core DbContext and database configuration |
| AppDbContext.cs |
| |
| |
| Middleware // Custom middleware |
| RoleAuthorizationMiddleware.cs |

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