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# DEEP DIVE INTO AI INNOVATIONS

with .NET 9 and GitHub Models

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Dual Microsoft MVP (AI & Azure)



# AI Fundamentals in .NET

.NET Application

ML.NET

Semantic Kernel

AI SDKs and Frameworks

AI SDKs

Vector Store  
SDKs

ONNX Runtime

TorchSharp

LightGBM

DataFrame

SciSharp

Tokenizers

Tensors

AI / Vector Data  
Abstractions

# New in .NET 9

## Tokenizers

- Tiktoken
  - GPT (3,3.5,4,4o,o1)
  - Llama 3
- SentencePiece
  - Llama 2
  - Mistral
- Codegen
  - Phi 2
  - Codegen
- WordPiece
  - BERT-based models

## TensorPrimitives

- Nearly 200 overloads for mathematical operations
- SIMD-optimized for better performance.
- Generic overloads

## Tensor<T> (Preview)

- Built on top of TensorPrimitives
- Seamless interop between AI libraries
- Easy and efficient data manipulation of multi-dimensional data

GPT-4o & GPT-4o mini

GPT-3.5 & GPT-4

GPT-3 (Legacy)

merhaba

Clear

Show example

Tokens

2

Characters

7

merhaba

GPT-4o & GPT-4o mini

GPT-3.5 & GPT-4

GPT-3 (Legacy)

merhaba

Clear

Show example

Tokens

3

Characters

7

merhaba



```
for object to mirror_mod.mirror_object
operation == "MIRROR_X":
mirror_mod.use_x = True
mirror_mod.use_y = False
mirror_mod.use_z = False
operation == "MIRROR_Y":
mirror_mod.use_x = False
mirror_mod.use_y = True
mirror_mod.use_z = False
operation == "MIRROR_Z":
mirror_mod.use_x = False
mirror_mod.use_y = False
mirror_mod.use_z = True

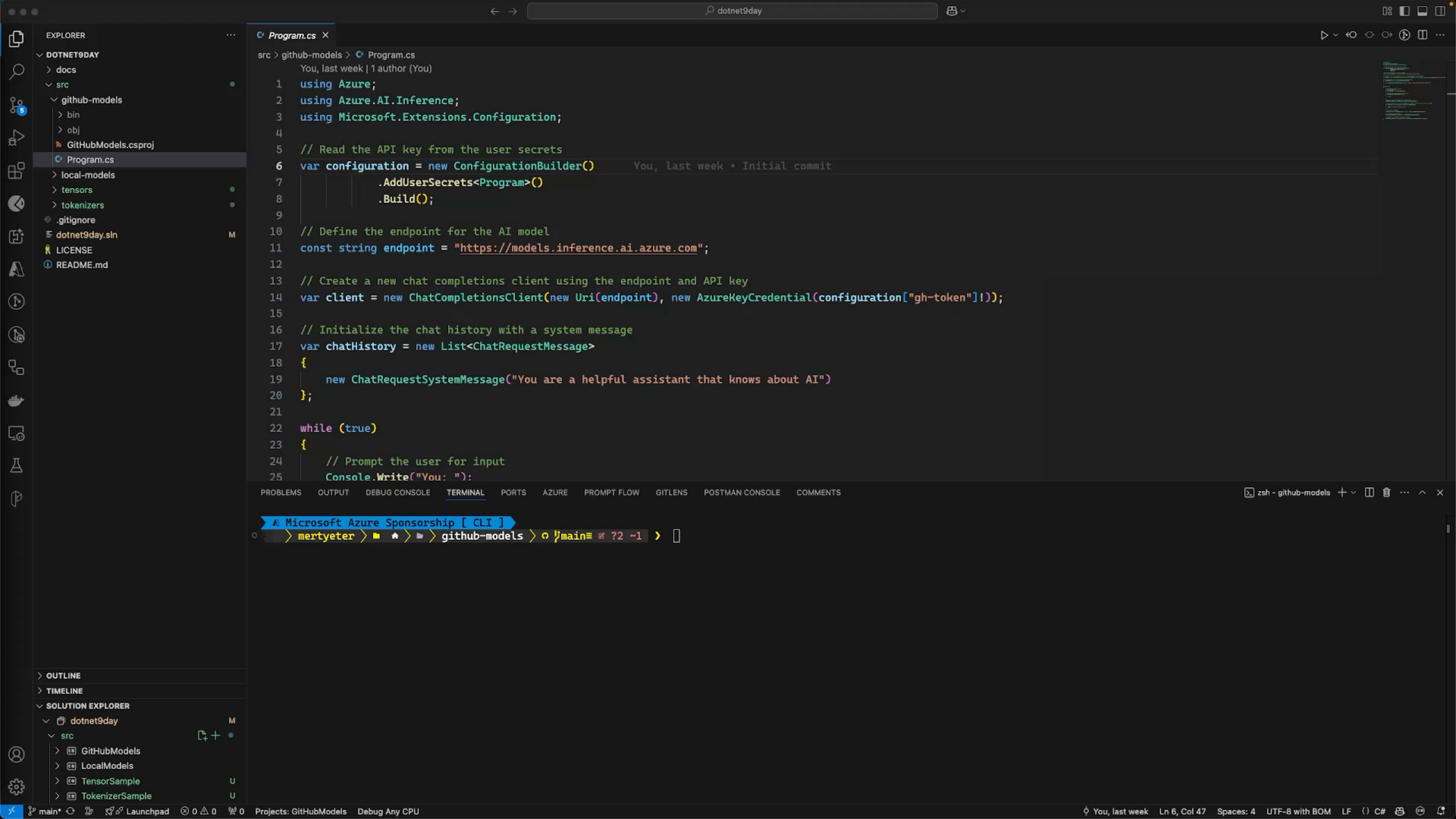
#selection at the end -add
mirror_ob.select= 1
modifier_ob.select=1
context.scene.objects.active
("Selected" + str(modifier
mirror_ob.select = 0
= bpy.context.selected_object
data.objects[one.name].select

print("please select exactly

-- OPERATOR CLASSES -----
```

# DEMO

```
types.Operator):
X mirror to the selected
object.mirror_mirror_x"
mirror X"
```



Program.cs

src > github-models > Program.cs

You, last week | 1 author (You)

```
1 using Azure;
2 using Azure.AI.Inference;
3 using Microsoft.Extensions.Configuration;
4
5 // Read the API key from the user secrets
6 var configuration = new ConfigurationBuilder()
7     .AddUserSecrets<Program>()
8     .Build();
9
10 // Define the endpoint for the AI model
11 const string endpoint = "https://models.inference.ai.azure.com";
12
13 // Create a new chat completions client using the endpoint and API key
14 var client = new ChatCompletionsClient(new Uri(endpoint), new AzureKeyCredential(configuration["gh-token"]));
15
16 // Initialize the chat history with a system message
17 var chatHistory = new List<ChatRequestMessage>
18 {
19     new ChatRequestSystemMessage("You are a helpful assistant that knows about AI")
20 };
21
22 while (true)
23 {
24     // Prompt the user for input
25     Console.Write("You: ");
```

You, last week • Initial commit

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS AZURE PROMPT FLOW GITLENS POSTMAN CONSOLE COMMENTS

zsh - github-models

```
Microsoft Azure Sponsorship [ CLI ]
> merteyer > github-models > ./main.py ?2 ~1 >
```

OUTLINE

TIMELINE

SOLUTION EXPLORER

dotnet9day
src
 GitHubModels
 LocalModels
 TensorSample
 TokenizerSample

main\* Launchpad 0 0 0 Projects: GitHubModels Debug Any CPU

You, last week Ln 6, Col 47 Spaces: 4 UTF-8 with BOM LF {} C#





## Build with AI

Get started with AI application templates. Edit and deploy to Azure using VS Code or GitHub Codespaces.

### Featured AI templates



#### Build RAG apps with LlamaIndex

A foundation for building advanced RAG applications with LlamaIndex.ai and JavaScript.

TypeScript GPT-3.5 Turbo Code Llama Interactive Chat  
+ 3 more



17 42

#### Multimodal GenAI experience: Q&A on uploaded images

Shows how to chat with uploaded images using OpenAI vision models such as GPT-4o.

Python GPT-4 Omni Interactive Chat Azure Container Apps  
+ 3 more



22 38

#### RAG chat with Azure AI Search + Python

Creates a ChatGPT-like frontend with API backend that uses OpenAI chat models to answer questions about uploaded...

Python TypeScript GPT-3.5 Turbo Guided Search + 6 more



4.4K 6.5K

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### Filter by

#### Task

- ☐ Agent
- ☐ Interactive Chat
- ☐ Completions
- ☐ LLM Ops

Search templates

Showing 5 templates

Filters applied: .NET/C# Clear all

Copilot sample app with Azure CosmosDB for NoSQL

OpenAI + Semantic Kernel chat app quick start

OpenAI chat with .NET Aspire and Microsoft Extensions AI