



Artificial Intelligence

Everything Everywhere All at Once

My First Programming Experience



```
File Edit Search Run Compile Debug Tools Options Window Help
[ ] PRNFLT.RPAS 1=[ ]
const
  MaxAttributes = 8;

type
  TPCharArray = array[0..MaxAttributes-1] of Byte;
  PPCharArray = ^TPCharArray;

  PPrinterCodes = ^TPCharArray;
  TPrinterCodes = record
    { Number of printer codes supported for this printer }
    PreambleCount: Byte;
    Preamble: PPCharArray;
    CodeArray: PPCharArray;
    { Array of indexes into the CodeArray corresponding to attributes supported for this printer. }
    Attributes: array[0..MaxAttributes-1] of Byte;
    { Codes sent at the start of a page. }
  end;

75:1
```

About

Turbo Pascal

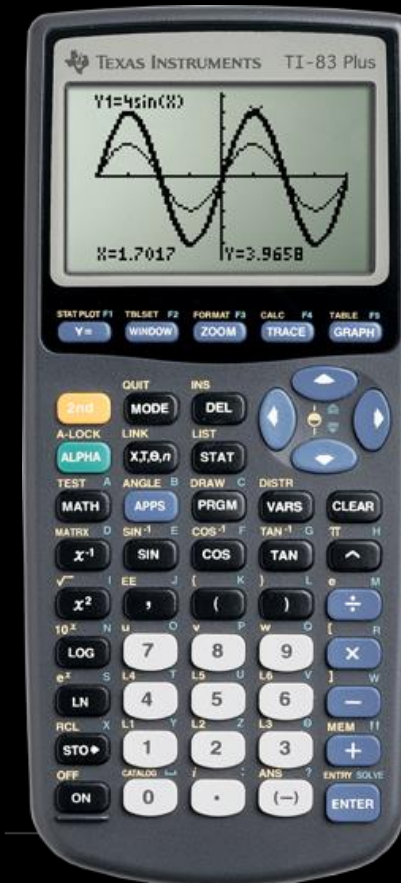
Version 7.0

Copyright (c) 1983,92 by
Borland International, Inc.

OK

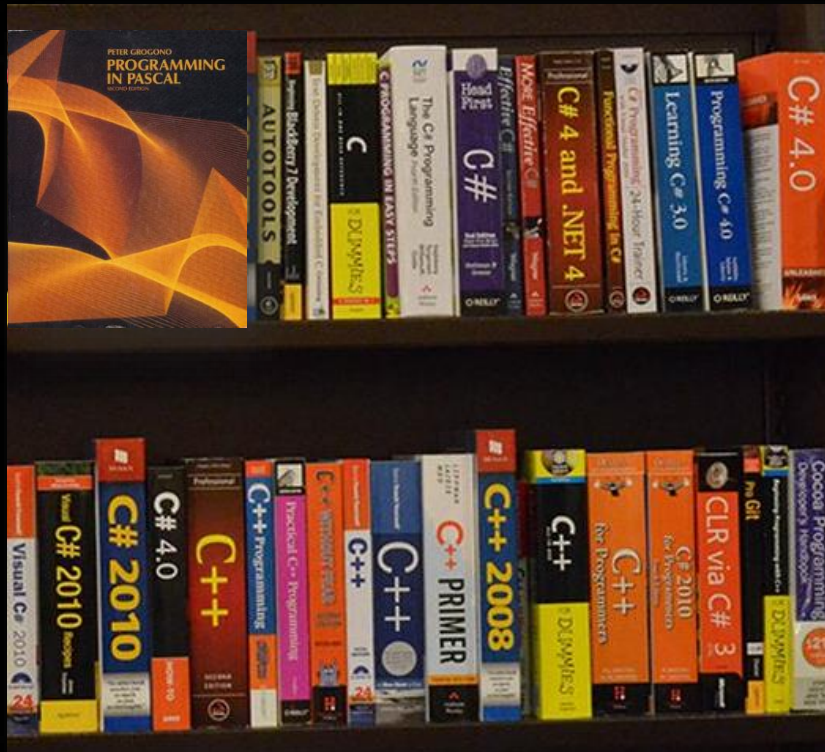
F1 Help Welcome to Turbo Pascal. Press Enter to close this dialog box

PASCAL



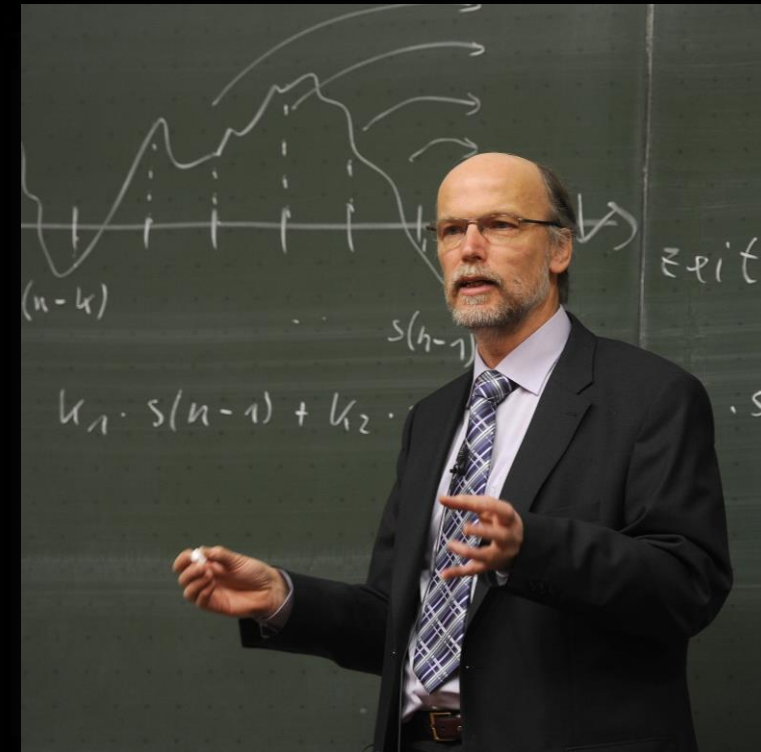
TI-BASIC

Information Access 1.0



Books and Manuals

Slow Access and Dissemination



Tutors and Peers

Localised / Variable Quality / Time Constrained

Information Access 2.0



Internet

Fast Access and Dissemination



The WWW Virtual Library



• Agriculture <i>Agriculture, Beer & Brewing, Gardening...</i>	• International Affairs <i>International Security, Sustainable Development, UN...</i>
• Computer Science <i>Computing, Graphics, Languages, Web...</i>	• Law <i>Law, Environmental Law...</i>
• Communications and Media <i>Communications, Telecommunications, Journalism...</i>	• Business and Economics <i>Economics, Finance, Transportation...</i>
• Education <i>Education, Cognitive Science, Libraries, Linguistics...</i>	• Recreation <i>Recreation, Games, Gardening, Sport...</i>
• Engineering <i>Civil, Chemical, Electrical, Mechanical, Software...</i>	• Regional Studies <i>Asian, Latin American, West European...</i>
• Humanities <i>Anthropology, Art, Dance, History, Museums, Philosophy...</i>	• Science <i>Biosciences, Medicine & Health, Physics, Chemistry...</i>
• Information Management <i>Information Sciences, Knowledge Management...</i>	• Society <i>Political Science, Religion, Social Sciences...</i>

Mirrors: [Stanford](#) (USA), [Penn State](#) (USA), [East Anglia](#) (UK), [Geneva](#) (CH), [Geneva-2](#) (CH), [Argentina](#).

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Last update Nov 23 1998

Web Pages

Directory-based and Linked Information

Information Access 3.0



AltaVista The most powerful and useful guide to the Net

Ask AltaVista™ a question. Or enter a few words in any language

Example: Where can I download mp3 files for instrumental music?

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Search the web using Google

[More Google!](#)

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Web Search Engines
Fast Discovery by Keywords

Information Access 3.1



IDEs Examples



```
int main(void) {  
    void *p;  
    /* Init board hardware. */  
    BOARD_InitBootPins();  
    BOARD_InitBootClocks();  
    BOARD_InitBootPeripherals();  
    /* Init FSL debug console. */  
    BOARD_InitDebugConsole();  
  
    p = malloc(1024);  
    printf("p = %p\n", p);  
    perror("malloc");  
    /* Force volatile access */  
    while(1)  
        i++;  
    return 0;  
}  
  
// EYE-RENDERING  
static void  
uint8_t  
uint32_t  
uint8_t  
uint8_t scleraX, // First pixel X offset into sclera image  
uint8_t scleraY, // First pixel Y offset into sclera image
```

- malloc (size_t nbytes) void *
- malloc (size_t size) void *
- malloc_stats (void) void
- malloc_usable_size (void *aptr) size_t
- mallopt (int param, int value) int
- mallopt (int parameter, value) int
- matherr (struct exception *e) int

Press 'Ctrl+Space' to show Template Proposals

Keyword Autocomplete

Fast Hints inside the Development Flow

These functions manage a pool of system memory.

Use malloc to request allocation of an object with at least nbytes bytes of storage available. If the space is available, malloc returns a pointer to a newly allocated block as its result.

If you already have a block of storage allocated by malloc, but you no longer need all the space allocated to it, you can make it smaller by calling realloc with both the object pointer and the new desired size as arguments. realloc guarantees that the contents of the smaller object match the beginning of the original object.

Similarly, if you need more space for an object, use realloc to request the larger size; again, realloc guarantees that the beginning of the new, larger object matches the contents of the original object.

When you no longer need an object originally allocated by malloc or realloc (or the related function calloc), return it to the memory storage pool by calling free with the address of the object as the argument. You can also use realloc for this purpose by calling it with 0 as the nbytes argument.

The memalign function returns a block of size nbytes aligned to a given boundary. The align argument must be a power of two.

Function Documentation

Inside the Development Flow



TODAY

(IN SOME ORGANIZATIONS)

Information Access 4.0



AI Code Assistant

CHAT: GITHUB COPILOT

GitHub Copilot

Welcome, @ctorrao, I'm your Copilot and I'm here to help you get things done faster.

I'm powered by AI, so surprises and mistakes are possible. Make sure to verify any generated code or suggestions, and [share feedback](#) so that we can learn and improve. Check out the [Copilot documentation](#) to learn more.

Ask Copilot or type / for commands

js fetch_tweets.js fetch_tweets.py fetch_tweets.rb fetch_tweets.ts fetch_tweets.go

```
1 const token = process.env["TWITTER_BEARER_TOKEN"]
2
3 const fetchTweetsFromUser = async (screenName, count) => {
4   const response = await fetch(
5     `https://api.twitter.com/1.1/statuses/user_timeline.json?screen_name=${screenName}&count=${count}`
6   )
7   const headers = {
8     Authorization: `Bearer ${token}`,
9   }
10  const json = await response.json()
11  return json
12 }
```

Copilot

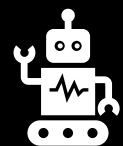
Chat

Always Available Tutor

Solution Suggestion

Fast Problem-Solving Capabilities

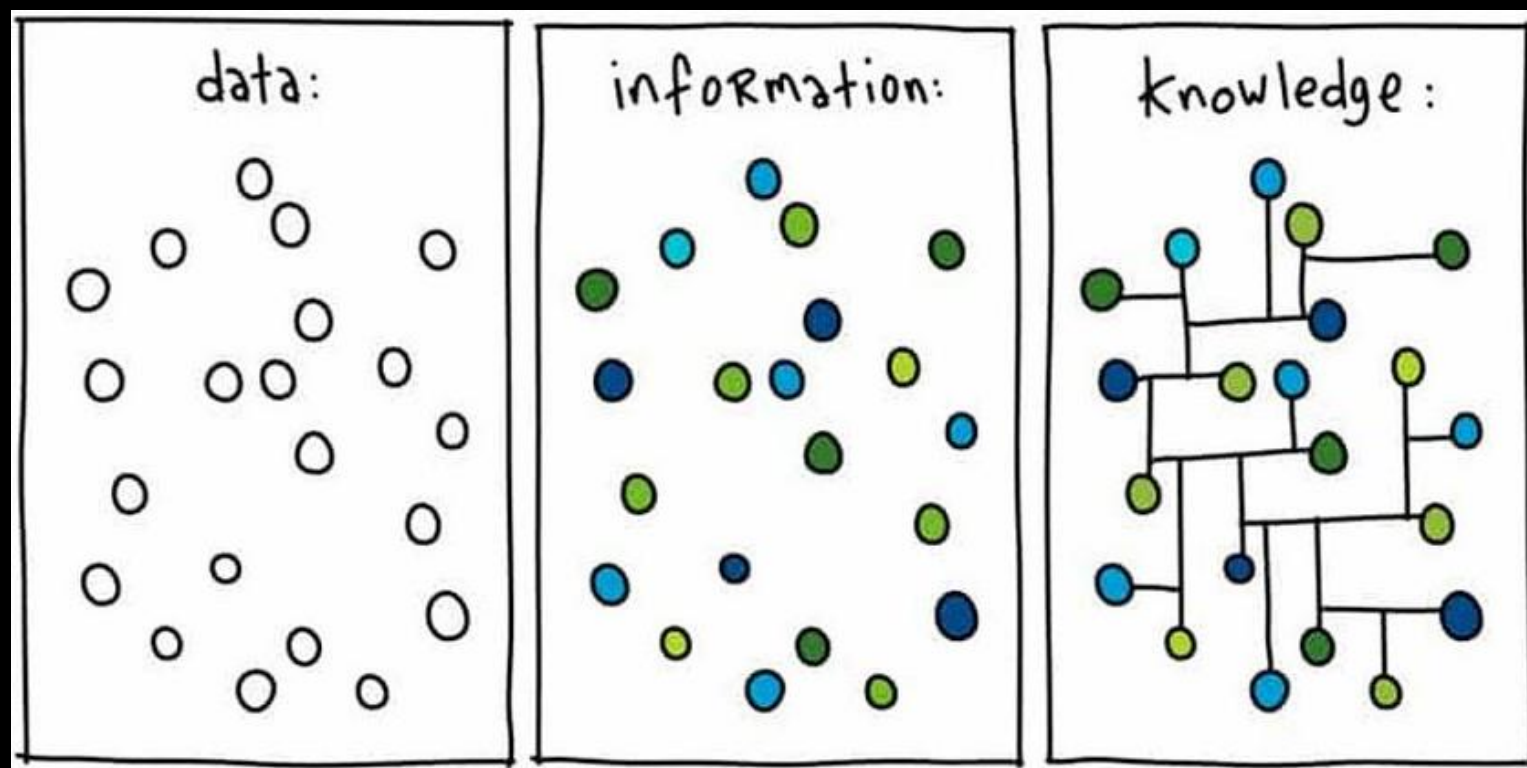
Information vs Knowledge



Robot



Human



Meaning

Context

Car AI Autopilot



Raw (Data)

#FF0000 light in a pole at location: 38.726117, -9.149729

Meaning (Information)

Traffic light is red in Av. Fontes Pereira de Melo

Context (Knowledge)

Driving towards red traffic light, hence I must stop the car

Information Knowledge Access 4.0



AI Code Assistant

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6   )
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8     Authorization: `Bearer ${token}`,
9   }
10  const json = await response.json()
11  return json
12 }
```

Copilot

Chat

Always Available Tutor

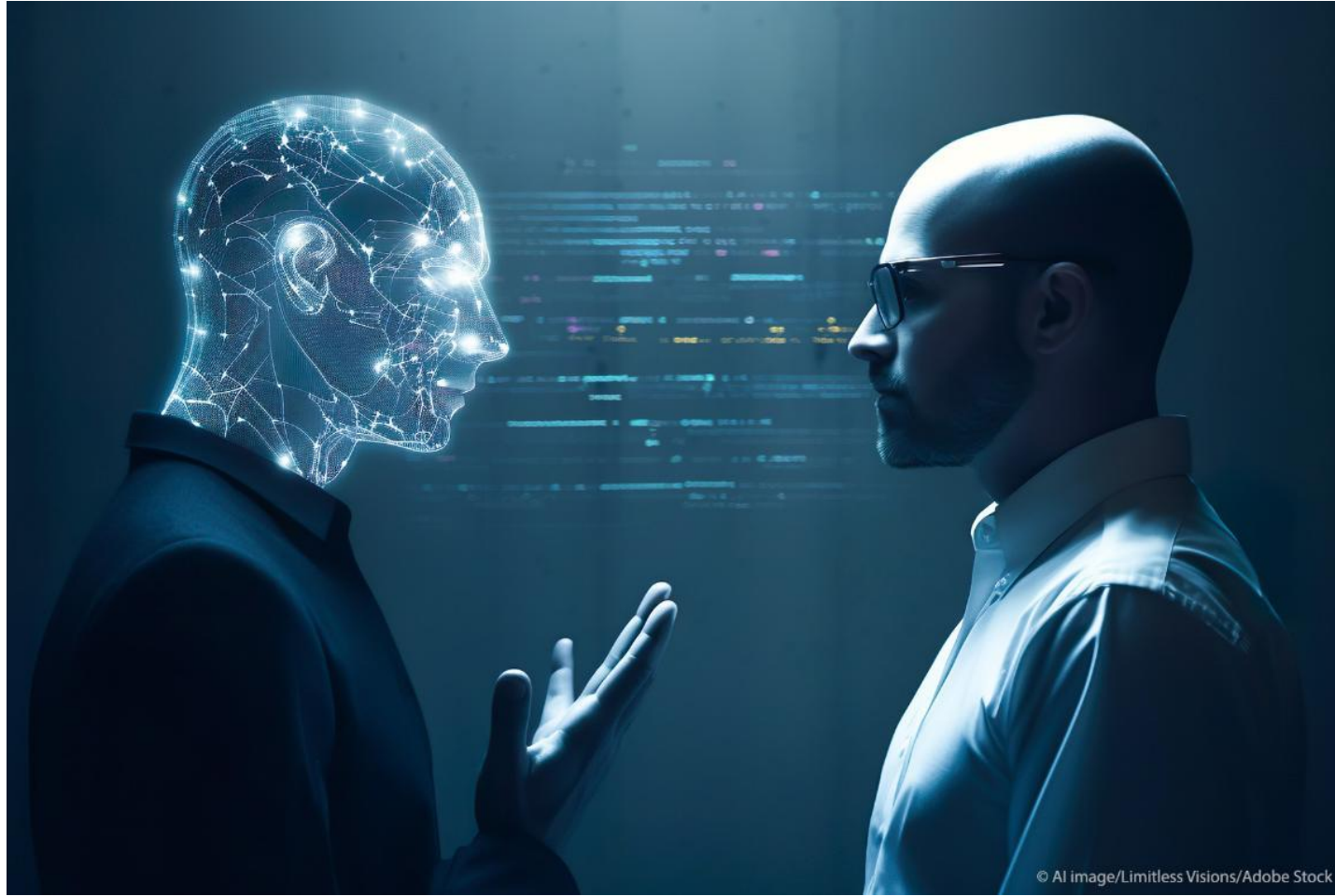
Solution Suggestion

Fast Problem-Solving Capabilities



FUTURE

AI Agents



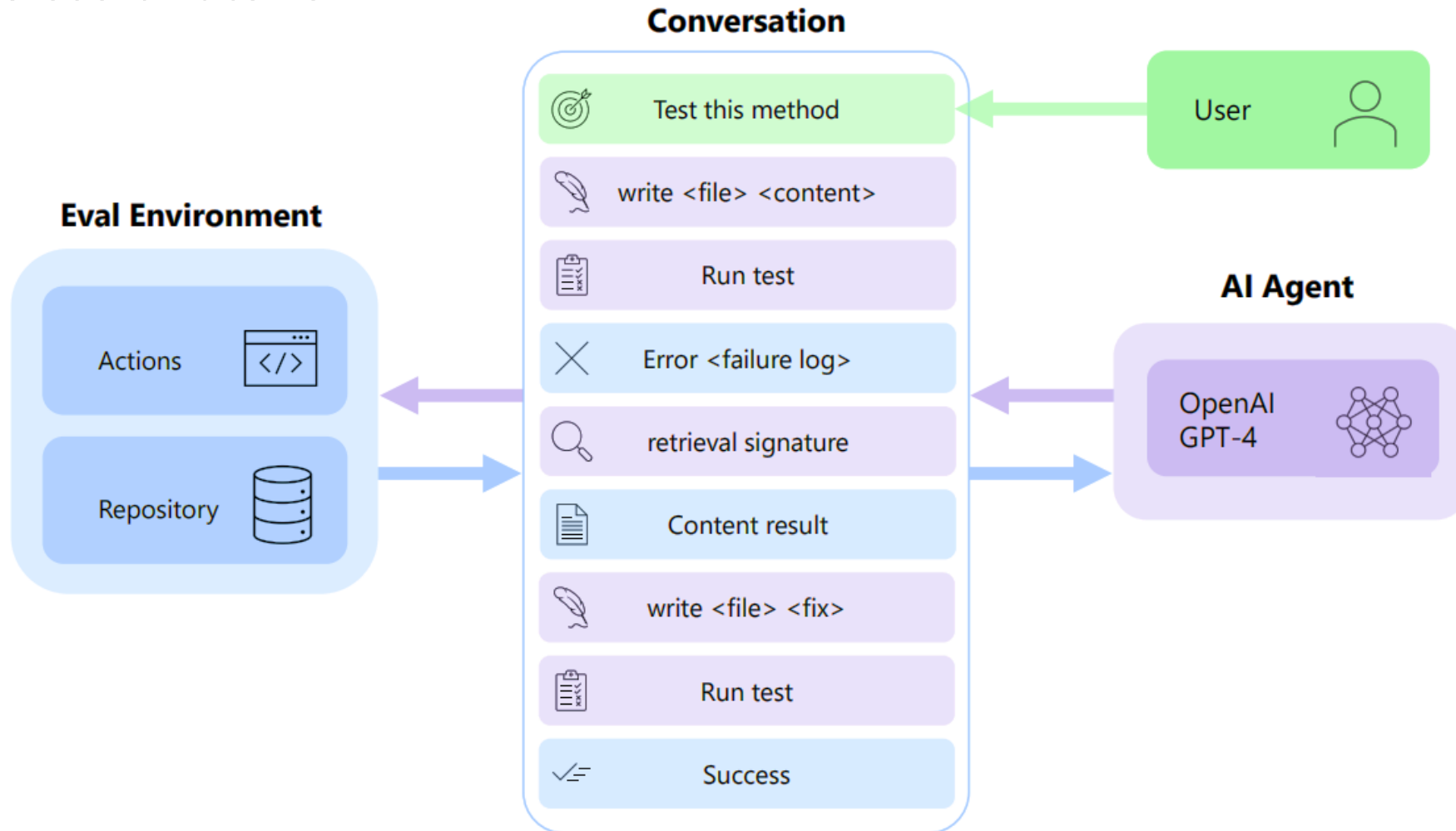
AI Software Engineer Agent

Can autonomously plan and implement software doing it step-by-step

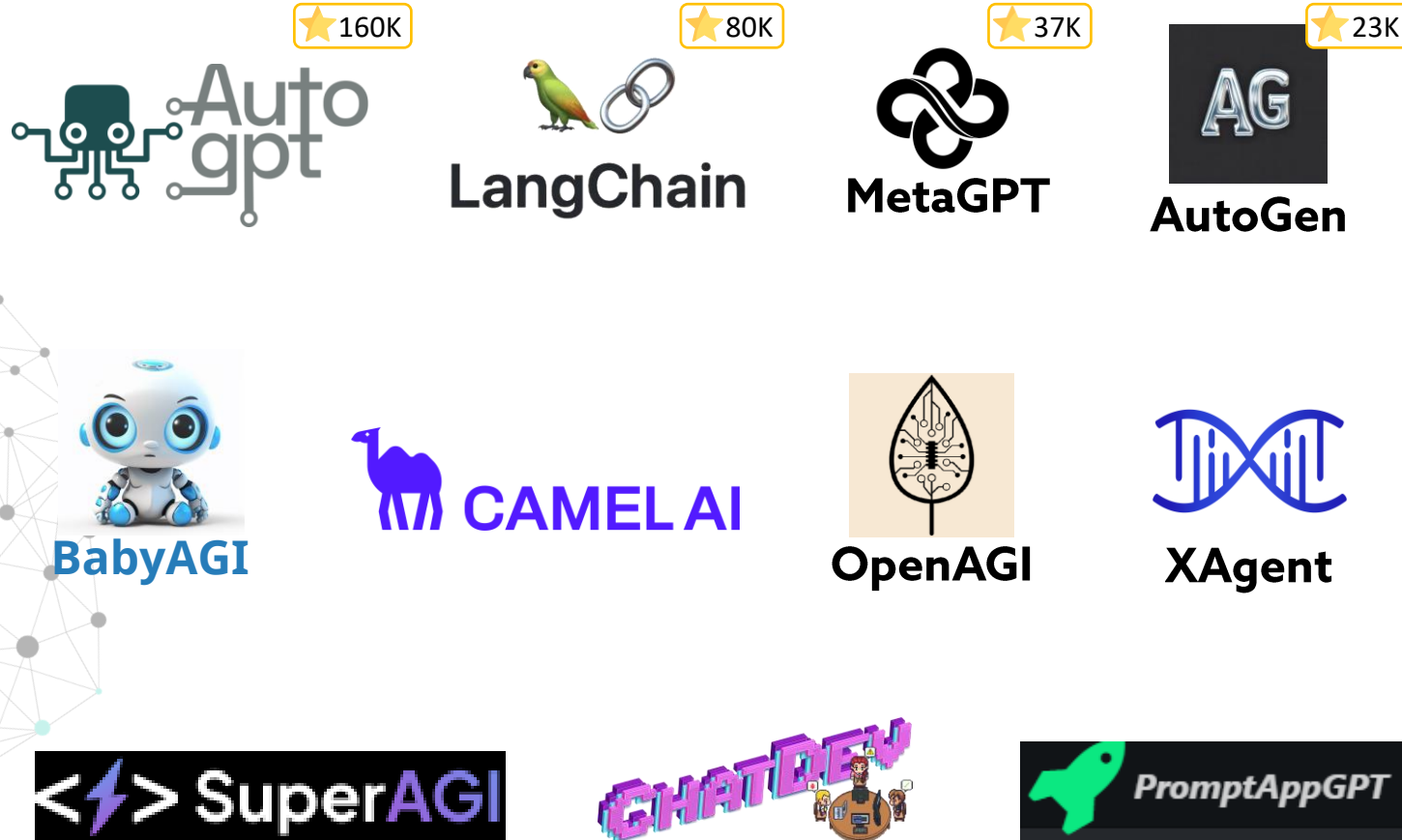
AI Agent Flow Example



Microsoft AutoDev



AI Agent Open-Source Frameworks



Plan & Tasks Decomposition

Tools Access & Execution

Agent Roles Specialization

Multi-Agent Communication

AI Model Agnostic

Still in PoC & Prototype Stages

Human Collaboration



Human Specialized Reviewers

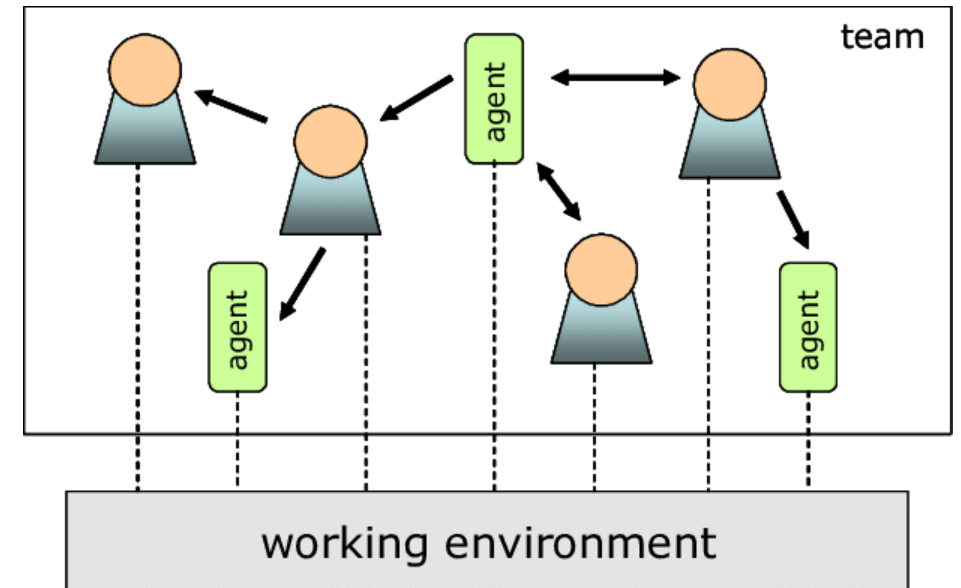
We need human know-how to review and not lose the codebase control

Observability & Traceability is Mandatory

Like the flight recorders in airplanes (but always available to read)

Continuous Improvement of AI Agents

Iterative process of adapting and evolve the agents' accuracy/capabilities



AI Tools in Development



2023 Developer Survey

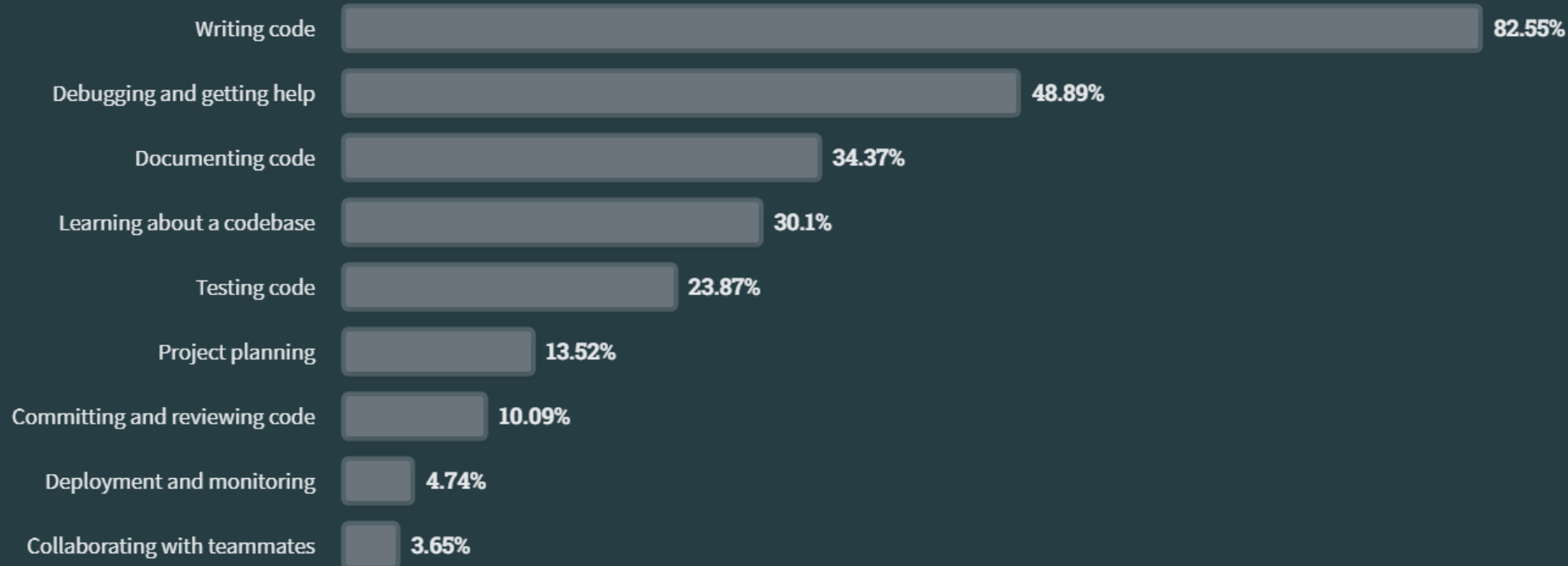
43%

Use AI Tools



57%

Don't Use AI Tools



On the Business Side



Time to Market

Fast Development and Progress



Costs

Less Time in Execution



Innovation

More time for new ideas and hypothesis

For the People



Fast Learning

Improve skills and knowledge



Challenging & Engaging

Problem-solving tasks (not repetitive ones)



Focus

"In the zone" without context switch

Key Takeaways



Data and Information are the Foundations of AI Future

Quality Data and Information are required for AI improvements

Knowledge Access Breakthroughs

Know-how and expertise can be augmented and improved with AI tools

Learn and Use AI Tools

AI Wave is increasing in size, do you want to surf it while it's still small or be crushed by it when it's too big?

Next Gen Workforce with Humans + AI Agents

Scale Up the Actionable Knowledge Workforce in Collaboration with Humans

AI Tech in Everything, Everywhere, All at Once

New generations expect advanced AI tools everywhere, like what happened with computers and mobile technologies



THANK YOU