Sectors, languages and software

In Programming you write Java. Then you open the news and every AI headline seems to mention Python. Did you pick the wrong language? Will an AI assistant write your code before you finish the course anyway?

Good questions, and they deserve data, not opinions. Today you look at three kinds of evidence: what European statistics say about which companies use AI, what real AI projects on GitHub are actually written in, and what developers themselves report in the largest surveys. Then you look at your own future job: what AI changes in software development, and what it does not.

What you will learn

- Name the sectors and kinds of company where AI is most used, with **Eurostat** figures
- Name the main **programming languages** and **libraries** for AI and what each one is for
- Check the languages of real AI projects on **GitHub** and cite developer surveys
- Describe how AI is changing **software development** and the developer's responsibility
- Avoid the trap of the day: "AI is Python" is only half true; the engine is often C++, and many apps just call a model through an **API**

Where AI is used most

> **Eurostat** is the statistical office of the European Union. Every year it asks companies with 10 or more people which digital technologies they use.

Its 2025 figures:

Figure (EU, 2025)	Value
Companies that use at least one AI technology	19.95% (about 6.5 points more than in 2024)
Large / medium / small companies	55.03% / 30.36% / 17%
Sector with most use: information and communication	62.52%
One of the sectors with least use: construction	10.79%
Country with most use / least use	Denmark 42.03% / Romania 5.21%
Most used AI technology: text mining	11.75%
Most common purpose: marketing or sales	34.70%

So roughly **one company in five** in the EU uses AI. It takes root first where there are **lots of digital data**, **repeated decisions with economic value**, and **staff who know how to use it**: that is why IT companies and large companies lead.

Beyond the ranking, some sectors have well-known uses:

Sector	Typical uses
IT and software	Code assistants, search, cybersecurity, content moderation
Finance and insurance	Fraud detection, credit risk, automated customer service
Health	Help with diagnosis from medical images, prioritising cases, drug research
Retail and marketing	Recommenders, customer segmentation, sales forecasts
Industry	Predictive maintenance, visual quality control, robotics
Transport and logistics	Routes, demand forecasting, driver assistance
Tourism	Dynamic pricing, occupancy forecasting, multilingual chatbots

Tourism is not at the top of Eurostat's table, but it is **our** sector, and you already found a real Balearic case in the last lesson. Remember too that hiring, credit and health are **high risk** under the AI Act.

Languages and tools

Language	Role in AI	Libraries and tools
Python	The reference language for training and experimenting: simple, with a huge ecosystem	NumPy, pandas, scikit-learn, PyTorch, TensorFlow/Keras, Hugging Face Transformers
C++ (and CUDA)	Speed: the engine under many libraries, and running models on devices and graphics cards	The cores of PyTorch and TensorFlow, llama.cpp
SQL	Getting and preparing the data	Databases and data warehouses
R	Statistics and data analysis	Statistical and visualisation packages
Java and Kotlin	Adding AI to business and Android apps, by calling models	LangChain4j, Deeplearning4j, API clients
JavaScript and TypeScript	Running or calling models in the browser and on the web	TensorFlow.js (the engine of Teachable Machine), API calls

> A **library** is code that somebody else wrote and published so you can reuse it. Nobody writes a neural network from zero: you import PyTorch.

Around the language there are three more tools you will meet:

- **Notebooks** such as Jupyter or Google Colab: one document that mixes code, text and results.
- **Graphics cards (GPUs)**, usually rented in the cloud from Unit 3, for training.
- **Ready-made models and AI cloud services** that you call through an **API**: a web address your program sends a request to and gets an answer from. Very often a company trains nothing; it **consumes** a model someone else trained.

> **Careful: "to do AI I must switch to Python"**
>
> To **train** and experiment, Python is the reference. To **use** AI inside an app, which is what most developers do, you call a model through an API from whatever language the app is written in: Java, Kotlin, JavaScript. Your Java is not wasted.

In class: what are real AI projects made of?

In pairs. On the page of every GitHub repository, the right-hand column shows a **Languages** bar with the share of each language. You do not need an account.

Step 1 — Choose **four** repositories from this list (at least one that is not mostly Python). Write down the **top three languages** with their percentage, the date you looked, and what the project is for, in one sentence from its README.

Repository	What it is
pytorch/pytorch	A deep learning library
tensorflow/tensorflow	Google's machine learning library
scikit-learn/scikit-learn	"Classic" machine learning in Python
huggingface/transformers	Ready-made models for text, images and sound
ggml-org/llama.cpp	Running language models on an ordinary computer
tensorflow/tfjs	TensorFlow for the browser
langchain4j/langchain4j	Adding language models to Java applications

Step 2 — Find and cite two figures in primary sources: **(a)** in Stack Overflow's 2026 Developer Survey (on stackoverflow.blog), the share of developers who use Python and the language in first place; **(b)** in GitHub's Octoverse 2025 report (on github.blog), the most used language on GitHub and the language that still leads AI and data science.

Step 3 — Answer: which project is "more C++ than Python", and why do you think so?

> **What you will probably find**
> The **interface** of most AI libraries is Python, but the part that has to be fast (the **engine**) is C++ or CUDA. In TensorFlow, C++ is more than half the code. A Java library like LangChain4j is almost entirely Java. Percentages change a little every day, so always write the date.

Hand in on Classroom (individual, "S18 · What are AI projects made of?", by 23:59 the same day): the table of your four repositories; the two cited survey figures; and **your own paragraph** (5–8 lines) on how AI would change the work of your project company's IT department. **No generative AI** in this activity.

AI in software development: your sector

Your qualification's sector is software development, and AI is changing it fast.

Area	What changes
Writing code	Assistants and agents complete and generate functions, tests and documentation, explain old code and help debug
Products	Apps add AI features (search, summaries, recommendations, chat) by calling models through APIs
Jobs	New roles: machine learning engineer, data engineer, model operations (**MLOps**)
Risks	Code with bugs or vulnerabilities that looks correct, unclear licences, confidential code leaking, losing your skills if you accept what you do not understand

Area	What changes
What does not change	Understanding the customer's problem, designing, reviewing, testing and **answering for** what you publish

Look at this code. An assistant proposed it to find a user. It compiles and it works. Would you accept it?

```
String sql = "SELECT * FROM usuaris WHERE nom = '" + nom + "'";
Statement st = con.createStatement();
ResultSet rs = st.executeQuery(sql);
```

It is vulnerable to **SQL injection**: whatever the user types is glued into the query, so a name containing a quote can change the query itself. The correct version uses a parameterised query (`PreparedStatement` with `?`). Generated code must be reviewed like the code of a new teammate.

> **SQL injection** is an attack where text typed by a user is executed as part of a database query, because the program pasted it in without separating data from code.

AI will most likely not take your job away; it will change it. Whoever can only copy what a tool proposes is replaceable. Whoever can explain **why** that code is wrong is not.

For your project

This lesson feeds Deliverable 4 · AI plan. It is also the session where your group shares out the sections and roles of the deliverable:

Today's work	Becomes	Criterion
Eurostat figures and the sector table	Section C: the AI landscape of the sector	d
Your paragraph on the IT department	Section C: how AI changes software work	f
Your four repositories and the survey figures	Section D: languages and tools	e

Key takeaways

- About **one EU company in five** used AI in 2025 (**Eurostat**); **information and communication** leads, large companies use it far more than small ones.
- **Python** is the reference for training; **C++** is often the engine; **SQL** prepares the data; Java, Kotlin and JavaScript integrate AI into apps.
- Many apps train nothing: they call a ready-made model through an **API**.
- Real projects on **GitHub** show it: Python on the outside, C++ on the inside. Cite the date, the numbers change.
- AI changes **software development** (assistants, new products, new roles) but you still **review**, **test** and **answer for** the code.

Quick check

1 According to Eurostat, which sector of the EU had the highest share of companies using AI in 2025?

- **A** Construction
- **B** Information and communication
- **C** Accommodation and food services
- **D** Agriculture

2 Why is C++ so important in AI if most people write AI code in Python?

- **A** Because C++ is easier to learn than Python
- **B** Because the fast engine under many Python libraries is written in C++
- **C** Because Python cannot do mathematics
- **D** Because GitHub only accepts C++

3 Your company's Java app needs to summarise customer reviews with a language model. What is the most common approach?

- **A** Rewrite the whole app in Python
- **B** Train a new language model from zero
- **C** Call a ready-made model through an API from the Java app
- **D** It cannot be done without a GPU in every office

4 Where do you see which languages a GitHub repository is written in?

- **A** In the name of the repository
- **B** In the Languages bar in the right-hand column of the repository page
- **C** Only after downloading all the code
- **D** In the list of contributors

5 An assistant proposes code that builds an SQL query by gluing in what the user typed. It compiles and works. What should you do?

- **A** Accept it: if it works, it is correct
- **B** Reject it and use a parameterised query, because it is open to SQL injection
- **C** Accept it, because the assistant is responsible for its code
- **D** Delete the database

6 Which two statements about AI and the developer's job are true?

- **A** Reviewing, testing and answering for the code remain the developer's job
- **B** Code assistants make knowing how to program unnecessary
- **C** New roles such as machine learning engineer and MLOps have appeared
- **D** AI is only used by developers who work in Python

7 A small hotel company in Menorca, with 15 staff, wonders why it uses less AI than a large chain. Which explanation fits the Eurostat data best?

- **A** Small companies are not allowed to use AI under the AI Act
- **B** AI use grows with size: large companies have more data, more repeated decisions and more specialised staff
- **C** AI only works in information and communication companies
- **D** Menorca is not part of the EU statistics

You now know where AI is used, what it is made of and what it changes for you. Time to put it all together for your company: Deliverable 4 · AI plan.

Solutions

1. B · **Information and communication** led with 62.52%. Construction was among the lowest, at 10.79%.

2. B · Python is the comfortable **interface**; the heavy calculations run in a **C++** (and CUDA) engine underneath. That is what the Languages bar of PyTorch or TensorFlow shows.

3. C · Most apps **consume** a model through an **API**. Libraries such as LangChain4j exist exactly for this in Java.

4. B · The **Languages** bar shows the share of each language. It changes over time, so always write the date you looked.

5. B · Working is not the same as safe. Gluing user text into a query allows **SQL injection**. The developer who publishes the code is the one responsible.

6. A, C · AI changes the job: new tools, new roles. The responsibility for what is published, and the skill to judge it, stay with you.

7. B · Eurostat shows a big gap by size: 55% of large companies against 17% of small ones. **Data**, **scale** and **skills** explain much of it, not the law.