

# Data Analysis

**Input:** data/cleaned\_data/cleaned\_data\_wokua.csv

**Output:** data/analyzed\_data/analyzed\_data\_workua.pdf

## Imports

## Data upload

	specialization	title	company	location	office	remote	years_of_experience	min_salary
0	python	Python Developer	Будыкин С.А., ФЛП	Unknown	0	1	0.0	NaN
1	python	Senior Python Engineer	UKEESS Software House	Unknown	0	1	5.0	NaN
2	python	Вчитель з програмування (створення ігор, вебро...	ITishniki school	Unknown	0	1	1.0	10000.0
3	python	Програміст для розробки інтерфейсів вимірюваль...	Новотест, ООО	Дніпро	1	0	0.0	40000.0
4	python	Python developer (FastAPI)	Halo Lab	Unknown	0	1	1.0	NaN

5 rows × 303 columns

The dataset contains vacancies about ukrainian tech job market (specifically focusing on Python, Java, and JavaScript roles) from the work.ua platform and includes:

- general information (title, company, work format);
- experience requirements;
- salary ranges;
- binary skill indicators (hard + soft skills);

# General analysis

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 105 entries, 0 to 104
Columns: 303 entries, specialization to Чесність
dtypes: float64(4), int64(295), object(4)
memory usage: 248.7+ KB
```

	specialization	title	company	location	office	remote	years_of_experienc
<b>count</b>	105	105	105	105	105.000000	105.000000	103.000000
<b>unique</b>	3	87	91	18	NaN	NaN	NaN
<b>top</b>	python	Python Developer	Logika, школа програмування та англійської МОВ...	Unknown	NaN	NaN	NaN
<b>freq</b>	64	5	5	54	NaN	NaN	NaN
<b>mean</b>	NaN	NaN	NaN	NaN	0.485714	0.514286	1.07767
<b>std</b>	NaN	NaN	NaN	NaN	0.502193	0.502193	1.31125
<b>min</b>	NaN	NaN	NaN	NaN	0.000000	0.000000	0.000000
<b>25%</b>	NaN	NaN	NaN	NaN	0.000000	0.000000	0.000000
<b>50%</b>	NaN	NaN	NaN	NaN	0.000000	1.000000	1.000000
<b>75%</b>	NaN	NaN	NaN	NaN	1.000000	1.000000	2.000000
<b>max</b>	NaN	NaN	NaN	NaN	1.000000	1.000000	5.000000

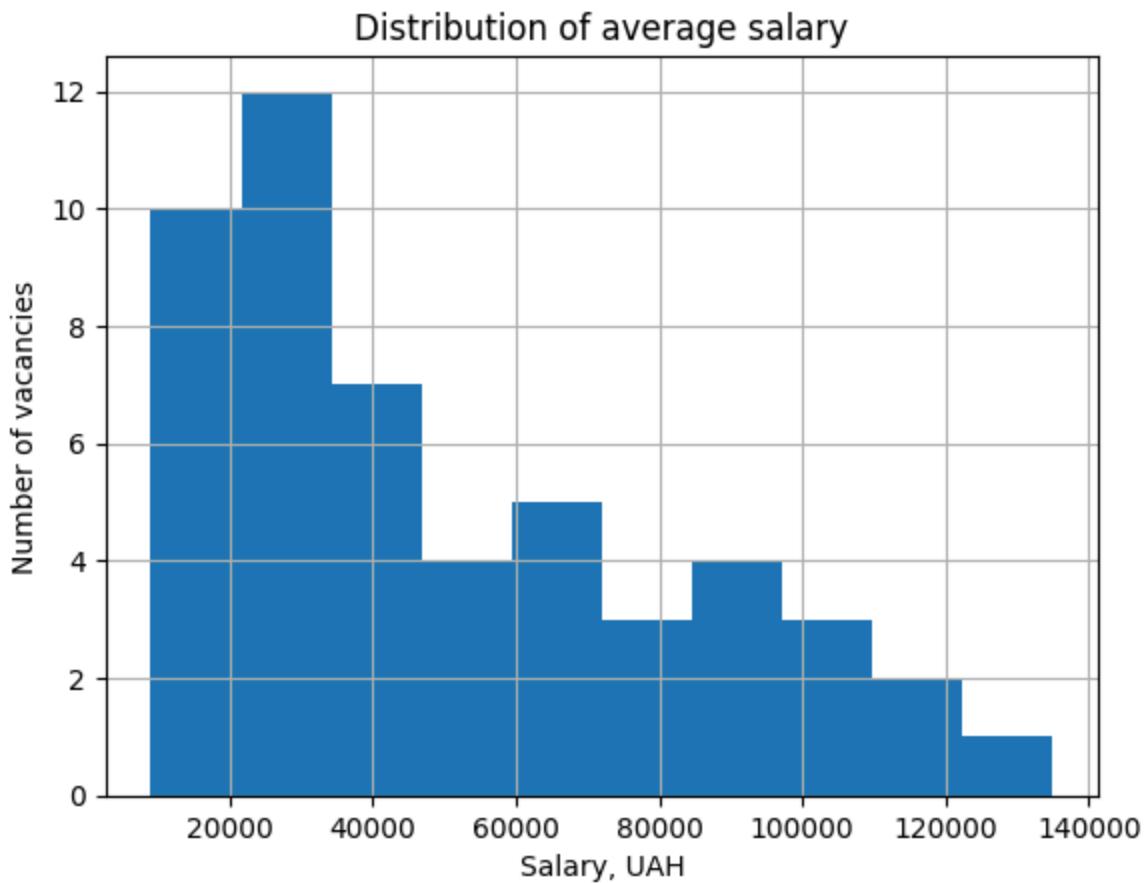
11 rows × 303 columns

The dataset consists of:

- 105 vacancies
- 303 columns, of which:
  - 10 — metadata
  - 290 — skills (0/1)

# Salary analysis

	<b>min_salary</b>	<b>max_salary</b>	<b>avg_salary</b>
<b>count</b>	51.000000	51.000000	51.000000
<b>mean</b>	35167.137255	64571.431373	49869.284314
<b>std</b>	23678.218302	45130.125111	32635.534347
<b>min</b>	6000.000000	12000.000000	9000.000000
<b>25%</b>	18000.000000	30000.000000	23750.000000
<b>50%</b>	25000.000000	50000.000000	40000.000000
<b>75%</b>	50000.000000	96271.500000	72500.000000
<b>max</b>	100000.000000	200000.000000	135000.000000



Salary distribution is asymmetrical:

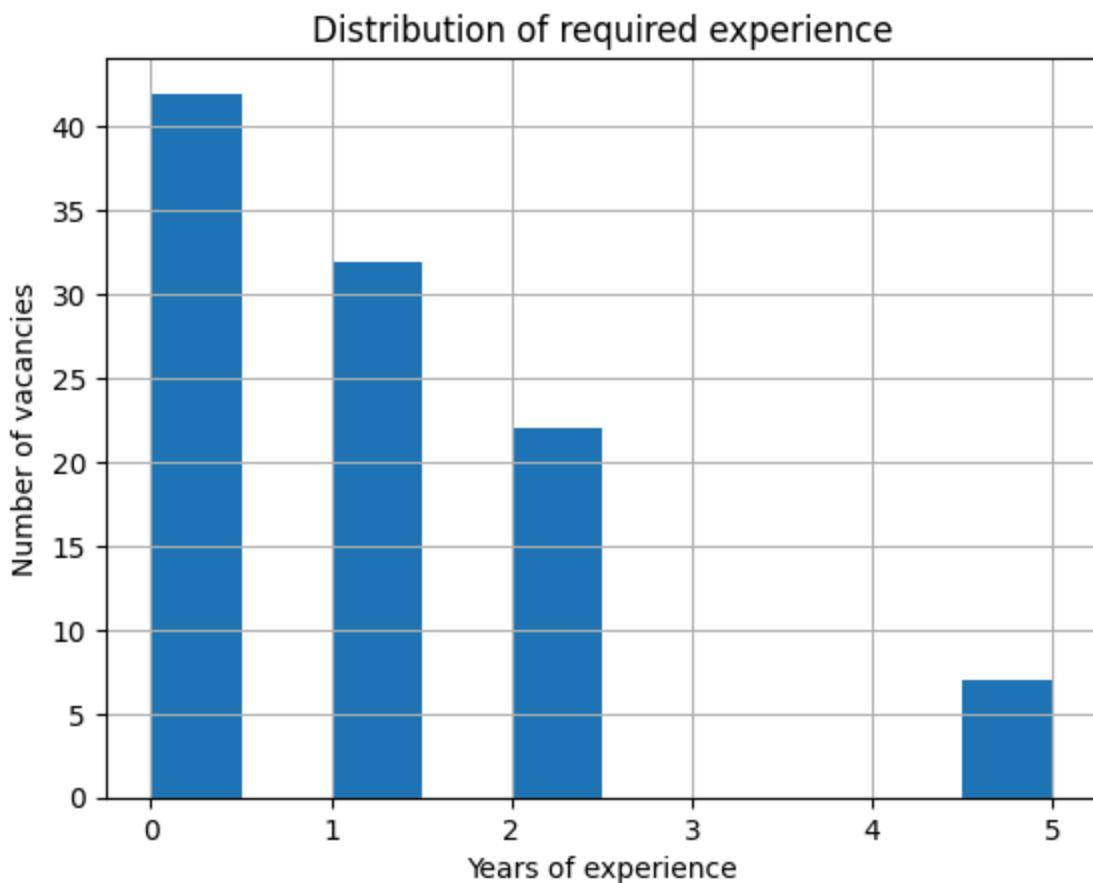
- the majority of vacancies: 20–45 thousand UAH
- there is a long "tail" up to 130+ thousand UAH

This indicates:

- a significant difference between Junior/Middle and Senior
- the presence of niche high-income positions

## Experience analysis

Years of Experience	Number of Vacancies	Share (%)
0	42	40.78
1	32	31.07
2	22	21.36
3	7	6.80

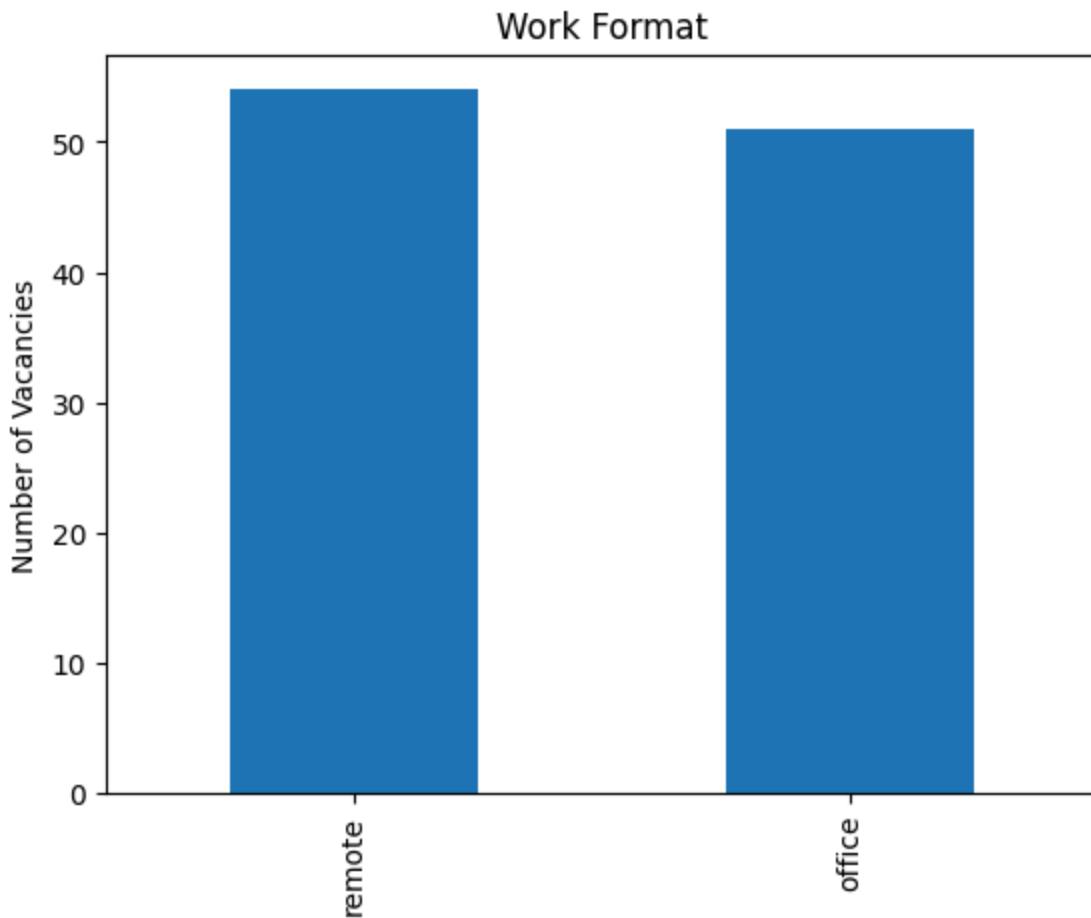


The table and the chart show that the tech job market is heavily focused on early-career professionals. Positions requiring 0–2 years of experience account for the majority of vacancies, indicating strong demand for Junior and early Middle-level developers.

Senior-level roles (5+ years of experience) are significantly fewer, which is typical for the job market and reflects higher entry barriers and more specialized requirements.

## Work format analysis

Work Format	Number of Vacancies	Share (%)
0	remote	54
1	office	51

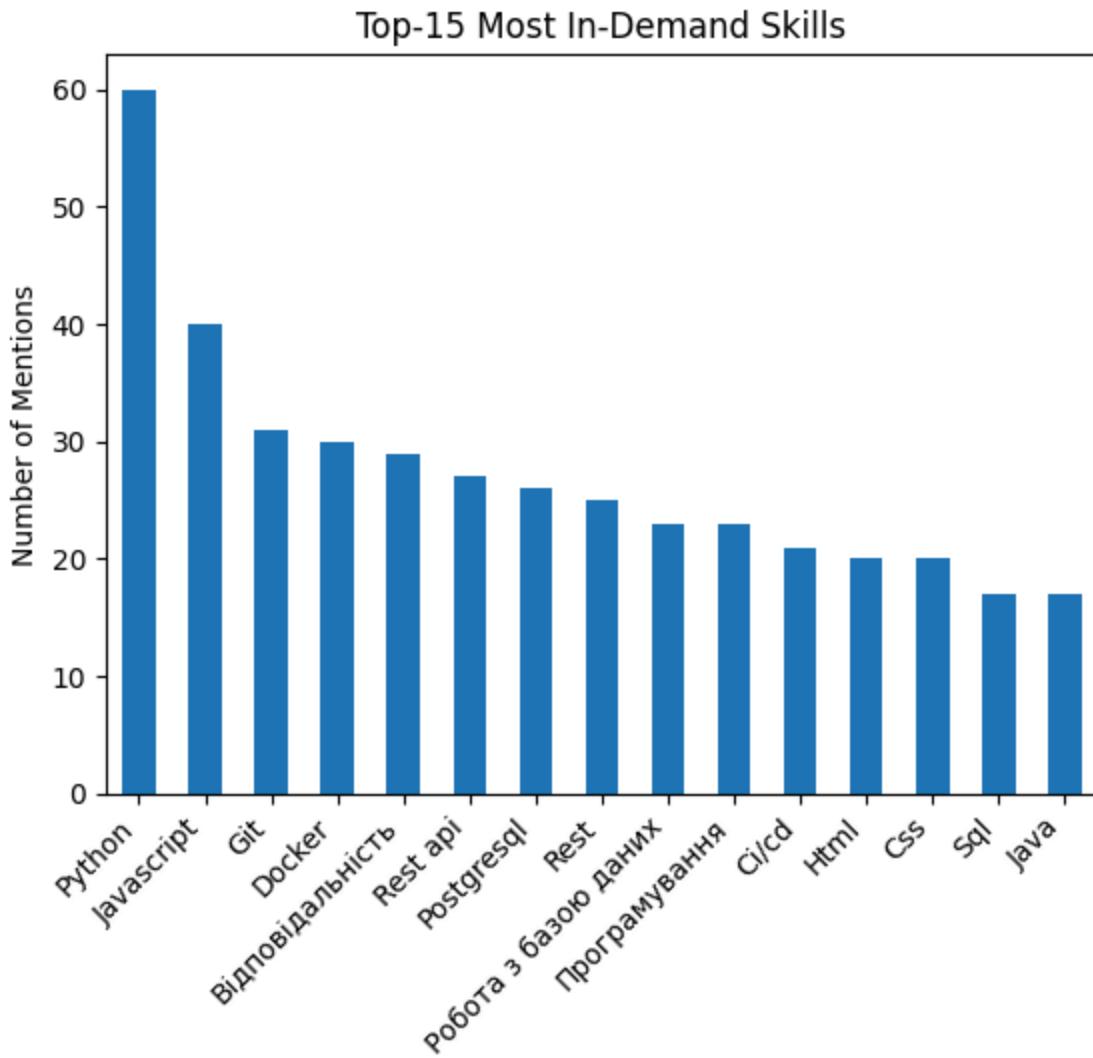


The table and the chart show an almost equal distribution between remote and office-based positions. This indicates that the tech job market offers a high degree of flexibility and is well-adapted to remote-first and hybrid work models.

Such balance makes tech roles accessible to a wider pool of candidates regardless of geographic location.

## Skills analysis

	<b>Skill</b>	<b>Number of Vacancies</b>	<b>Share (%)</b>
<b>0</b>	Python	60	57.14
<b>1</b>	Javascript	40	38.10
<b>2</b>	Git	31	29.52
<b>3</b>	Docker	30	28.57
<b>4</b>	Відповідальність	29	27.62
<b>5</b>	Rest api	27	25.71
<b>6</b>	Postgresql	26	24.76
<b>7</b>	Rest	25	23.81
<b>8</b>	Робота з базою даних	23	21.90
<b>9</b>	Програмування	23	21.90
<b>10</b>	Ci/cd	21	20.00
<b>11</b>	Html	20	19.05
<b>12</b>	Css	20	19.05
<b>13</b>	Sql	17	16.19
<b>14</b>	Java	17	16.19



The table and the chart present the most frequently required skills across tech vacancies. Python is a mandatory requirement in all postings, while complementary skills such as JavaScript, Git, Docker, and SQL significantly increase employability.

The presence of DevOps tools and soft skills among top requirements highlights the growing demand for versatile, production-ready developers.

## Correlation analysis

	Skill	Salary Correlation
0	Openai	0.433
1	Solid principles	0.429
2	Pytest	0.382
3	Ci/cd	0.378
4	Kotlin	0.373
5	Retrofit	0.373
6	Recyclerview	0.373
7	Okhttp	0.373
8	Jetpack compose	0.373
9	Charles	0.373

This table shows the skills that have the strongest positive correlation with average salary. These skills are typically associated with senior-level responsibilities: Openai, Ci/cd, Kotlin.

While correlation does not imply causation, the results indicate which competencies are commonly present in higher-paying roles.

## Clustering

	Cluster	Vacancies	Avg_Experience	Avg_Salary
0	0	27	0.48	25392.59
1	1	8	2.75	94216.69
2	2	14	0.71	66928.57

Based on experience requirements and salary levels, the clustering analysis revealed three distinct market segments:

- Cluster 0 — Entry-Level / Junior

This cluster represents the mass segment of the tech job market. Vacancies in this group typically require around 0.5 years of experience and offer an average salary of approximately 25,000 UAH. These roles are primarily focused on foundational development tasks and are well-suited for entry-level candidates starting their careers.

- Cluster 1 — Salary-Driven Senior-like (High-Paying Middle)

Although this cluster offers the highest average salary (around 94,000 UAH), the average experience requirement remains moderate (approximately 2.7 years). These positions typically involve higher responsibility, system ownership, and complex problem-solving. However, due to the relatively low experience threshold, this segment does not represent a classical Senior level. Instead, it reflects a high-paying Middle-level market segment driven by skill intensity rather than years of experience.

- Cluster 2 — High-Paying Junior / Middle

This cluster includes vacancies with relatively low experience requirements (around 0.7 years on average) but significantly higher compensation (approximately 67,000 UAH). Such roles often appear in remote-first teams, startups, or projects that demand a broader technical skill set, including FastAPI, DevOps tools, and production-oriented practices. This segment represents accelerated career opportunities for highly skilled junior or early middle developers.

## Conclusions

Based on the data analysis of the Work.ua job market (specifically focusing on Python, Java, and JavaScript roles), here are the general conclusions:

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### 1. Market Orientation

The current job market is heavily focused on early-career professionals. Most vacancies target candidates with 0 to 2 years of experience.

**Junior Roles:** Account for the vast majority of listings, making it a high-volume entry point for new developers.

**Senior Roles:** Positions requiring 5+ years of experience are significantly rarer, suggesting that senior recruitment might happen through other channels or represents a much narrower, specialized segment.

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### 2. Salary Trends and Experience Premiums

There is a clear "experience threshold" where compensation increases dramatically:

**The 2-Year Jump:** The average salary nearly doubles when moving from 1 year of experience (~41,000 UAH) to 2 years (~84,000 UAH).

**Specialization Premium:** While Python has the highest volume of vacancies, Java roles command a higher average salary (~62,000 UAH) compared to Python (~48,000 UAH) and JavaScript (~44,000 UAH) within this dataset.

**High-End Roles:** The market shows a long "tail" of high-paying positions (up to 135,000 UAH) that are often driven more by specific high-demand skills (like CI/CD, Kotlin, or AI/OpenAI) than by many years of experience.

### 3. Flexibility in Work Format

The market is almost perfectly split between Remote (51%) and Office-based (49%) positions.

This indicates a mature hybrid culture where candidates can prioritize flexibility.

Remote roles are often linked to the "High-Paying Junior/Middle" segment, likely reflecting competition from international startups or remote-first tech companies.

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### 4. Skill Requirements

To be competitive, a developer needs more than just a programming language. The "Core Stack" identified by the data includes:

Version Control: Git is a top-3 requirement across all specializations.

DevOps & Infrastructure: Tools like Docker and CI/CD are no longer optional "extras" but are frequently found in mid-to-high-paying roles.

Databases: Proficiency in PostgreSQL and general SQL/DB management is a primary requirement.

Soft Skills: "Responsibility" (Відповідальність) appeared as one of the most frequently mentioned keywords, highlighting that employers value reliability and ownership as much as technical prowess.

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### 5. Emerging Market Segments

The analysis identified three distinct types of vacancies:

The Mass Junior Segment: High volume, entry-level requirements, and an average salary of ~25,000 UAH.

The "Fast-Track" Junior/Middle: Roles that require less than 1 year of experience but pay significantly more (~67,000 UAH). These typically demand modern stacks like FastAPI and DevOps tools.

The Skill-Driven Middle: High-responsibility roles paying ~94,000 UAH. Interestingly, these often require only ~2.7 years of experience rather than the traditional "5+ years" for a Senior, proving that skill intensity is currently more valuable than tenure.

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### Summary for Job Seekers

To maximize salary potential early in a career, developers should focus on moving beyond basic coding into system architecture, DevOps tools (Docker/CI/CD), and database management, as these skills facilitate the jump into the 60,000+ UAH salary bracket regardless of years of experience.