



Introduction to Programming and Problem Solving

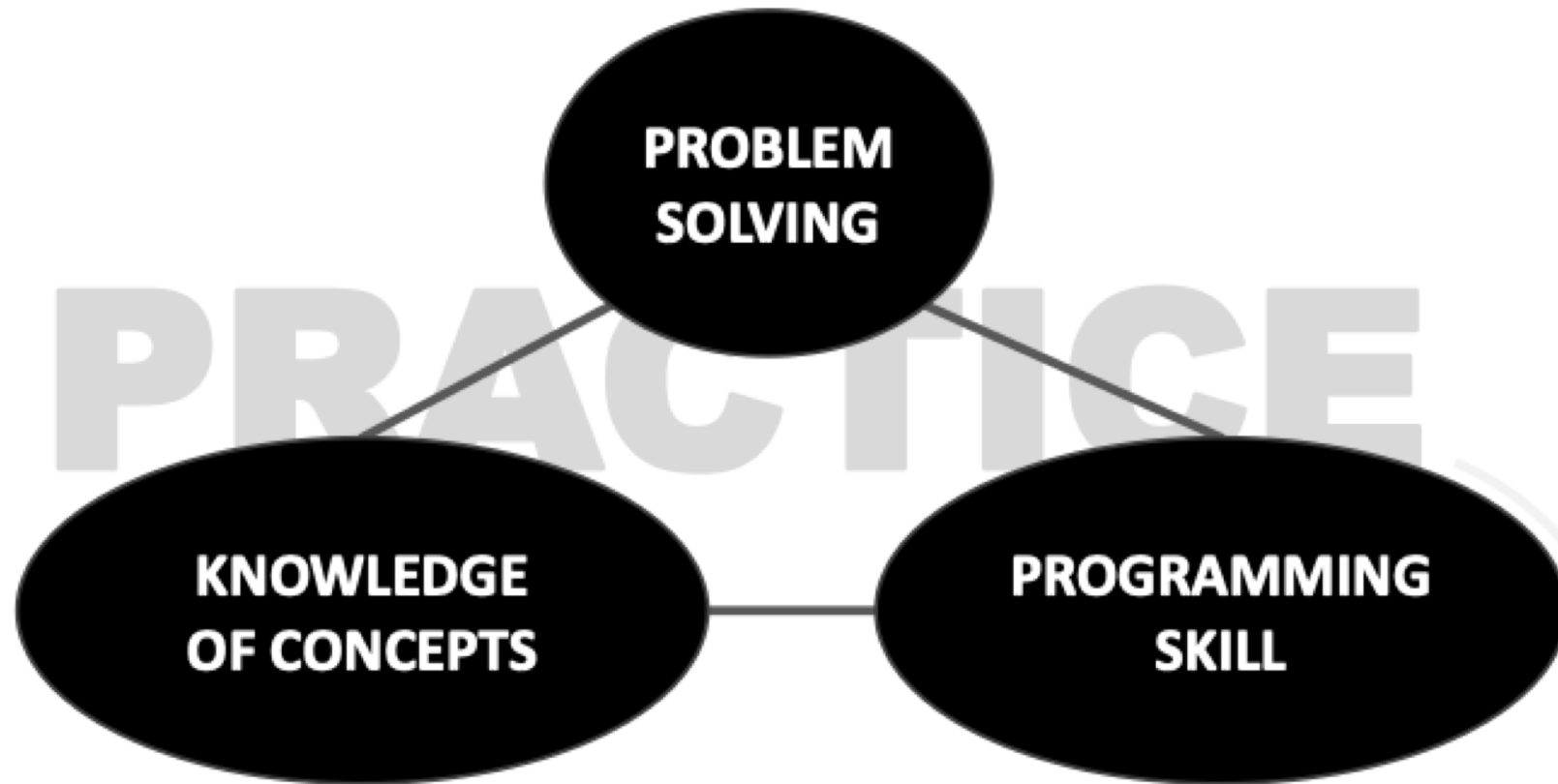
Erdogan Dogdu

Computer Science Department

ASU



This course is about ...



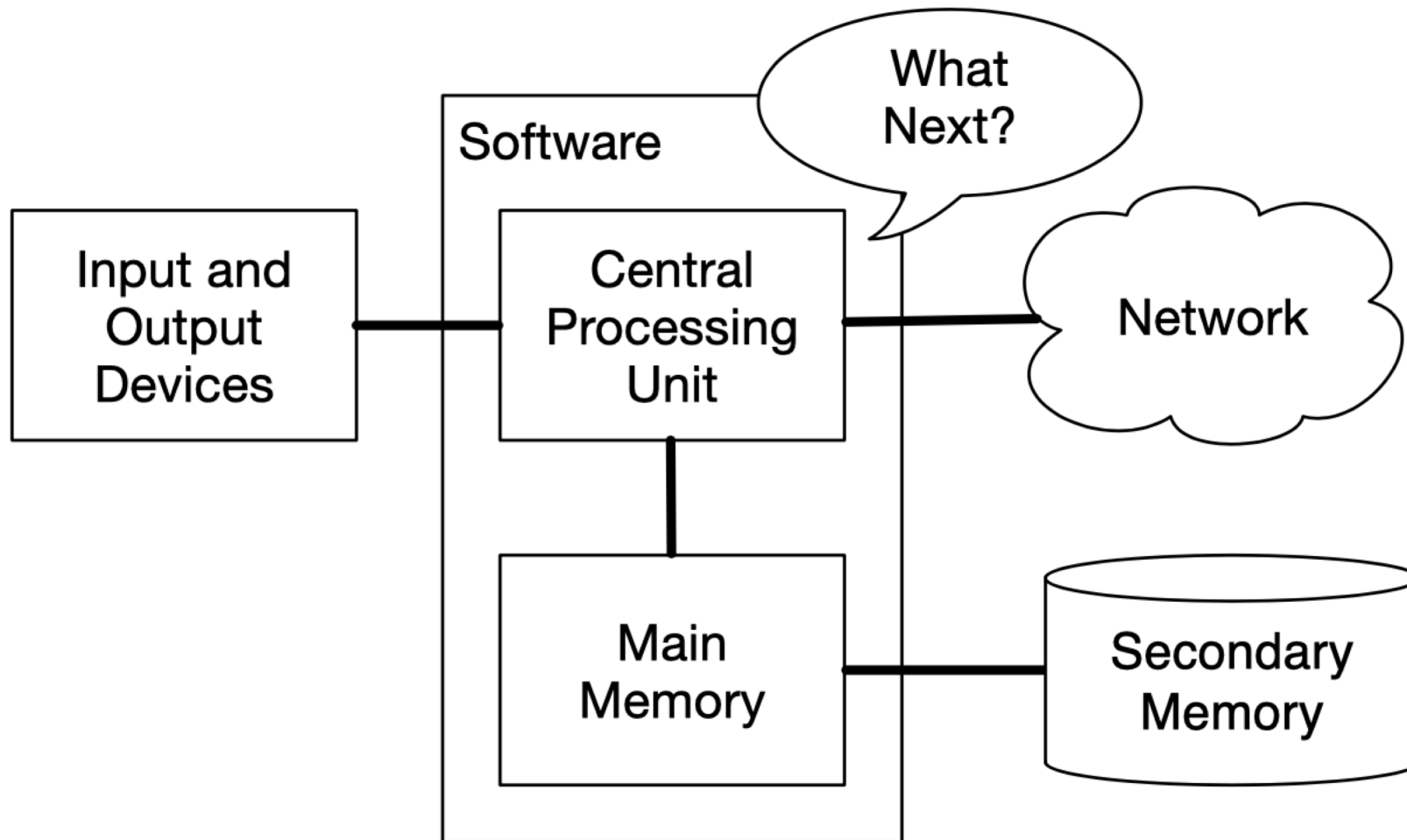
How do we use computers?

- Prepackaged applications
 - MS Word, Excel, Powerpoint, Web browser, email client, etc.
 - Great if that is just what you want!
- Programming
 - Enables you to do anything with a computer (almost!)
 - Program
 - A software that can be translated to running code and executed on a computer

How to program computers

- Machine language
 - Cannot be written easily by a programmer, impossible for complex tasks
- High-level language
 - Python, Java, C++, Javascript, SQL, etc.
- Natural language (for future)
 - Like Siri
 - Not possible for complex tasks (yet)

Computer architecture



Machine language

```
001010001110100100101010000001111
11100110000011101010010101101101
...
```

- Computers only run machine language programs
- So, high-level language programs (Python, Java, C, etc.) needs to be **translated into machine language first**
 - **Compiler** (Java, C, C++, etc.)
 - The whole program is first translated and then run
 - **Interpreter** (Python, Javascript, PHP, etc.)
 - Line by line translation and execution

Python reserved keywords

and	del	global	not	with
as	elif	if	or	yield
assert	else	import	pass	
break	except	in	raise	
class	finally	is	return	
continue	for	lambda	try	
def	from	nonlocal	while	

Our Choice: Python



- <https://www.python.org>
- Interpreted, high-level, general-purpose programming language
- Widely used
- Widely available
- Continuously under development since early 1990s
- Embraces full set of modern abstractions
- Our approach
 - Use a minimal subset of Python
 - Develop general programming skills that are applicable to many languages.

Motivation for learning Python + CS

- Many jobs
- High salaries
- Exciting work

Python popularity

- IEEE Spectrum 2019 Survey
Python #1

Rank	Language	Type	Score
1	Python	  	100.0
2	Java	  	96.3
3	C	  	94.4
4	C++	  	87.5
5	R		81.5
6	JavaScript		79.4
7	C#	   	74.5
8	Matlab		70.6
9	Swift	 	69.1
10	Go	 	68.0

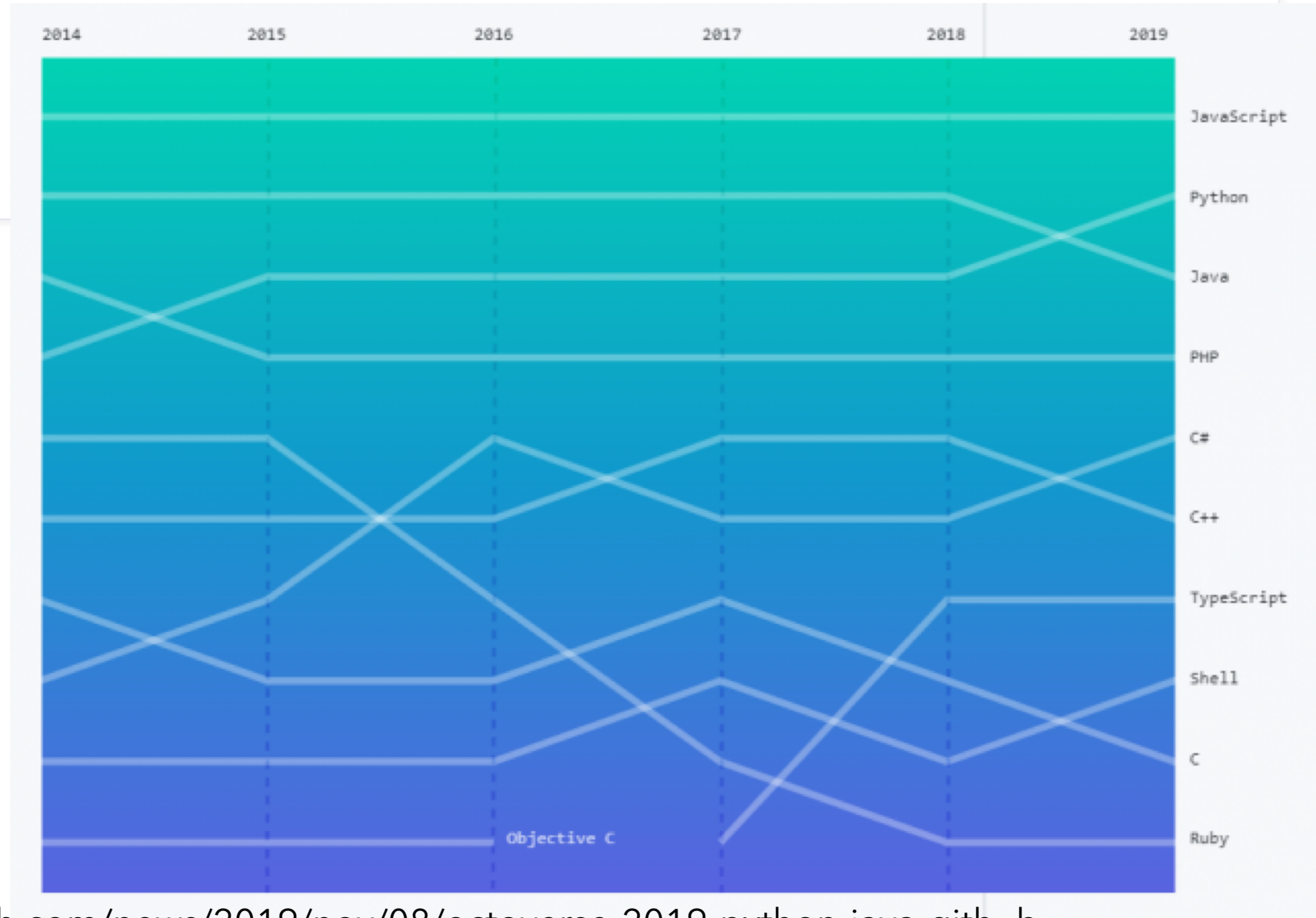
<https://spectrum.ieee.org/computing/software/the-top-programming-languages-2019>

Python popularity

GitHub

Popular
Languages
2019

Python #2
for first time



<https://www.developer-tech.com/news/2019/nov/08/octoverse-2019-python-java-github-most-popular-language/>

Jobs



python

San Angelo, Texas, United St

Jobs ▾

Sort by ▾

25 miles (40 km) ▾

Date Posted ▾

Python in San Angelo, Texas, United States

1 result

Job Alert
Off



Software Engineer Promoted

CyberCoders
San Angelo, TX, US





Be an early applicant

2 days ago ·  Easy Apply

Jobs





 Texas, United States

Jobs ▾


Sort by ▾


Date Posted ▾


LinkedIn Features

Python in Texas, United States

7,754 results

Job Alert Off 







Python Developer

Promoted

Motion Recruitment

Fort Worth, Texas, United States

5 days ago ·  Easy Apply





Apache Spark with Pyspark

Promoted

W3Global


Irving, Texas, United States

 Be an early applicant

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Jobs





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Python in United States

106,851 results

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Python Developer

Promoted

Motion Recruitment

Fort Worth, Texas, United States

5 days ago ·  Easy Apply





Python Developer

Promoted

Wipro Limited

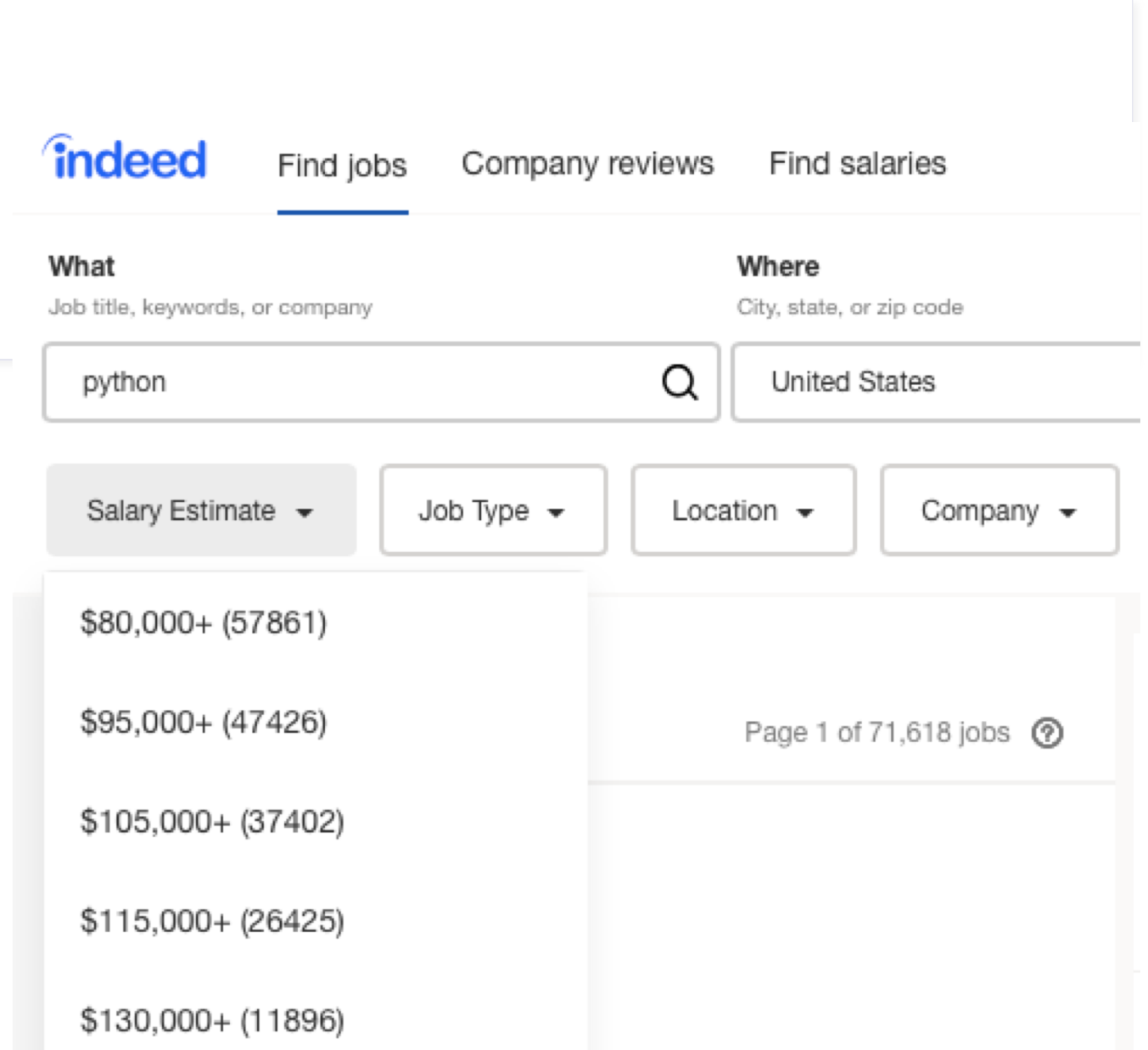
San Jose, California

 2 alumni work here

1 month ago ·  Easy Apply

Salary

- Source: **indeed.com**



The screenshot shows the Indeed website's search interface. At the top, the Indeed logo is on the left, and navigation links for 'Find jobs', 'Company reviews', and 'Find salaries' are on the right. Below the navigation bar, there are two main search sections: 'What' and 'Where'. The 'What' section has a text input field containing 'python' and a search icon. The 'Where' section has a text input field containing 'United States'. Below these sections, there are four filter buttons: 'Salary Estimate', 'Job Type', 'Location', and 'Company'. The 'Salary Estimate' button is currently selected, and a dropdown menu is open below it, showing a list of salary ranges and the number of jobs for each: '\$80,000+ (57861)', '\$95,000+ (47426)', '\$105,000+ (37402)', '\$115,000+ (26425)', and '\$130,000+ (11896)'. To the right of the salary dropdown, there is a box indicating 'Page 1 of 71,618 jobs' with a help icon.

indeed Find jobs Company reviews Find salaries

What
Job title, keywords, or company

python

Where
City, state, or zip code

United States

Salary Estimate ▾ Job Type ▾ Location ▾ Company ▾

\$80,000+ (57861)

\$95,000+ (47426)

\$105,000+ (37402)

\$115,000+ (26425)

\$130,000+ (11896)

Page 1 of 71,618 jobs ?

Reasons for Python popularity

- Ease of use and fast development
- Many libraries
 - Machine learning
 - AI
 - Math
 - Big data
 - and more ...

