Python For Cloud & Embedded systems

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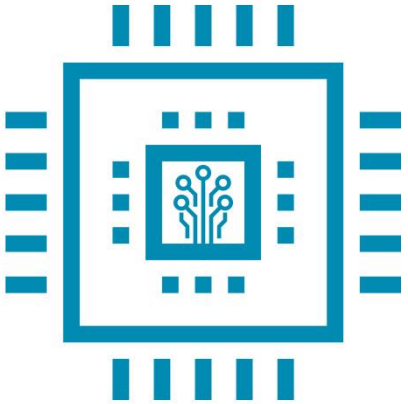
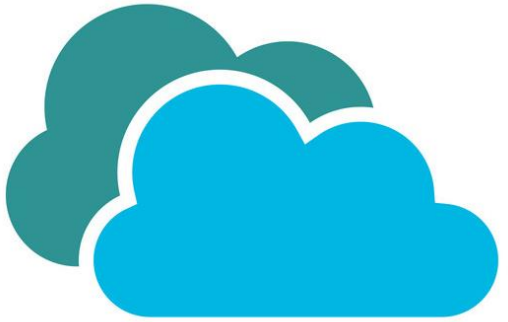
1st Feb 2020 - Amrita University

Agenda

- Introduction to Python.
- Python History and Trends.
- A Practical intro to networking basics.
- The what & how of APIs.
- Cloud computing.
- Introduction to networked embedded systems.
- Python for embedded systems.





Introduction to Python

Introduction to Python

General purpose, object oriented, FOS scripting language.

33 keywords.

Originally built in the ‘90s by Guido van Rossum to bridge the gap between C and Shell.

Very easy to get started with a read-eval-print loop (**REPL**) aka Interactive Shell.

Whitespaces to delimit blocks in script files.

Extensible with other programming languages like C.

Huge collection of “modules” and tools to get your work done.

Keywords in Python

False	class	finally	is	return
None	continue	for	lambda	try
True	def	from	nonlocal	while
and	del	global	not	with
as	elif	if	or	yield
assert	else	import	pass	
break	except	in	raise	

Python Trends

Python trends

01

Started off as a scripting language with specific uses.

02

Perl was a competitor for a long time.

03

Started gaining traction as a web backend tool.

04

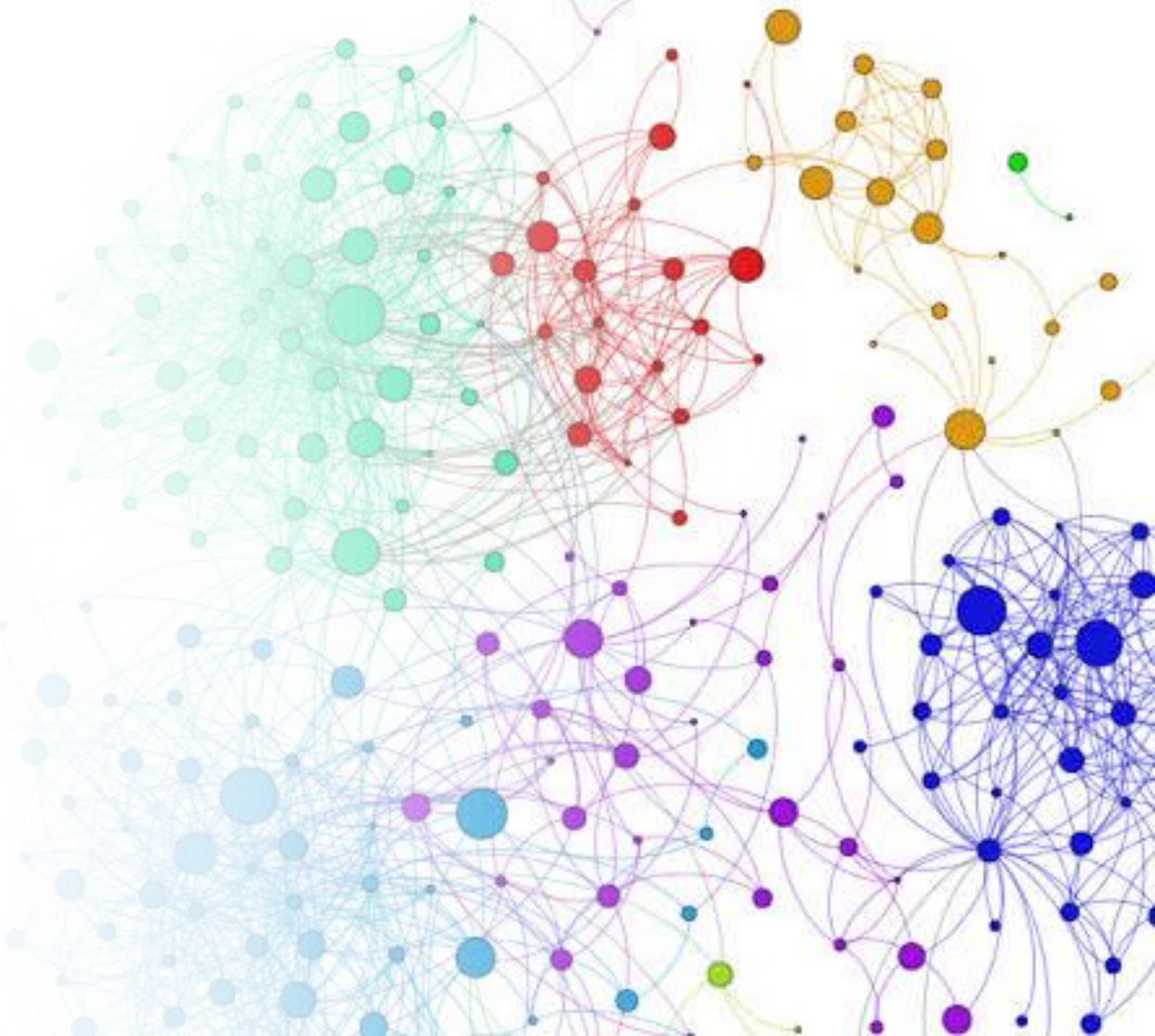
Machine learning gave it a huge boost.

- R was a competitor for a long time .

Lab 1 – Getting started

setting up your development environment

A Practical intro to networking basics



Networking basics

- Connectivity and the world of networking
  - How it all started
- Getting things connected.
  - The world wide web.
- Internet of computers and internet of things.
  - Embedded networking , data and Machine learning

Lab 2 – Net Basics

Understanding networking basics with python.

Sidetrack – Python virtual environments

- Virtual environments are necessary to ensure your applications are not affected by a system wide update
  - Module updates are not always backward compatible.
- When you launch VS Code from Anaconda, you are already executing within a virtualenv.

Lab 3 – virtualenv

working with virtual environments for python.

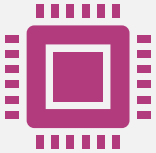
The what & how of APIs

Application Programming Interface

Allows two applications to talk to each other.

Just like function calls.

Applications can reside in different machines or in different parts of the world.



REST APIs are one of the most used APIs when it comes to web services.

What is a web service?

Lab 4 – A Web Server

Setting up a web server and creating your own APIs

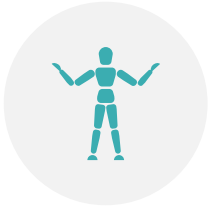
Lab 5 – Dev Web Service

Building a greeter web service.

Use Google Web APIs to create QR Codes.

Cloud computing

Introduction to cloud computing



The renters model

AAAS, PAAS, IAAS

AWS Cloud offerings

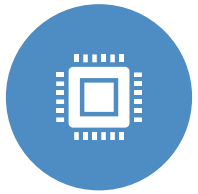
Serverless architecture

Lambda functions and API Gateway

Introduction to networked embedded systems

What are embedded systems?

Minicomputers built for a specific purpose



Microcontroller vs Microprocessors

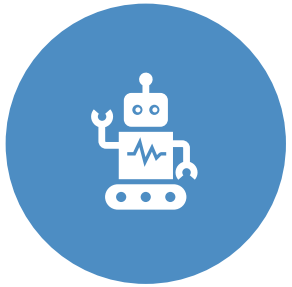
System constraints

Real time operations

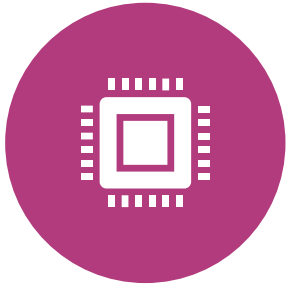
Mission critical and low power systems

Networking for embedded systems

Connected, distributed systems



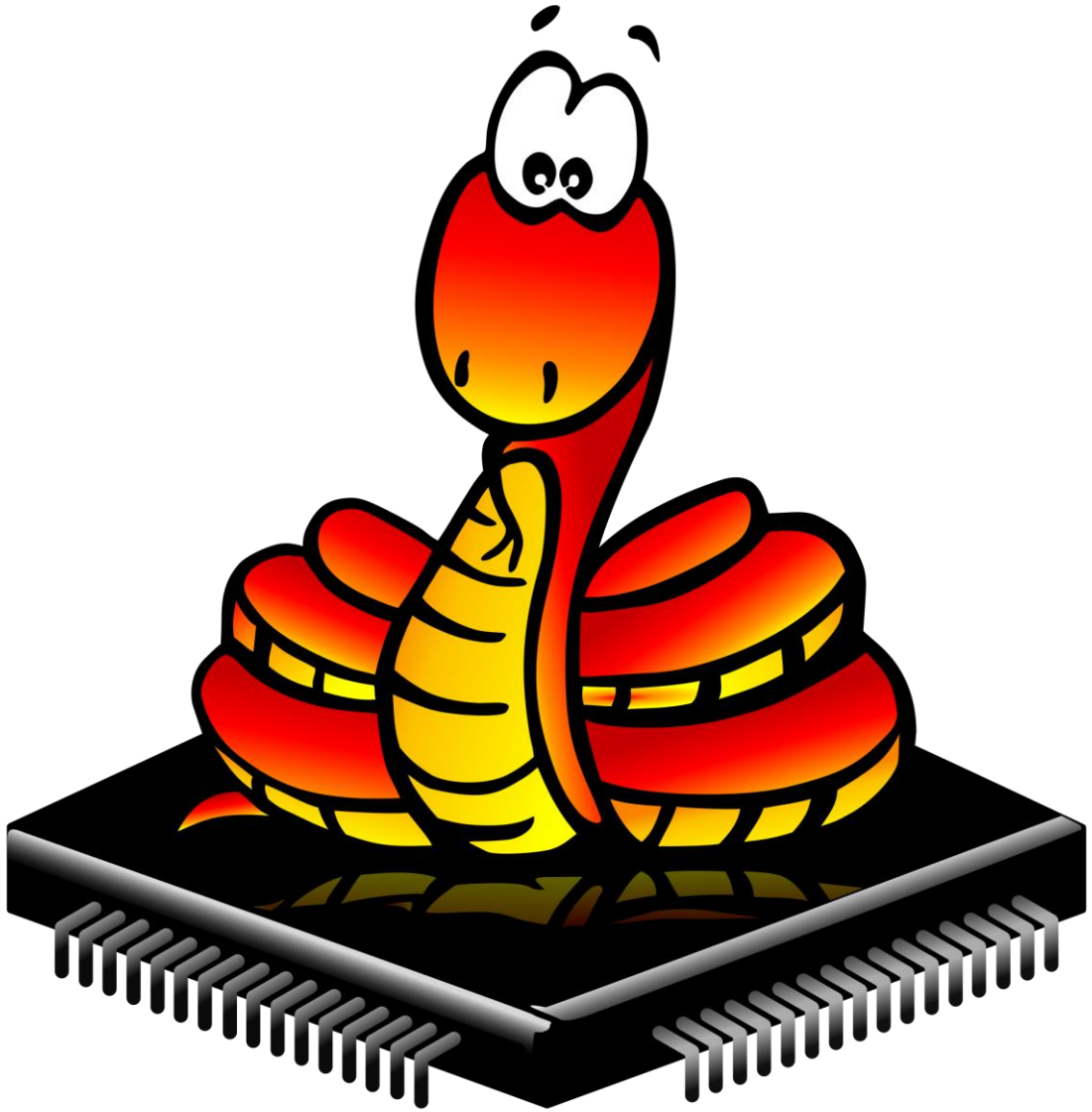
The IoT boom



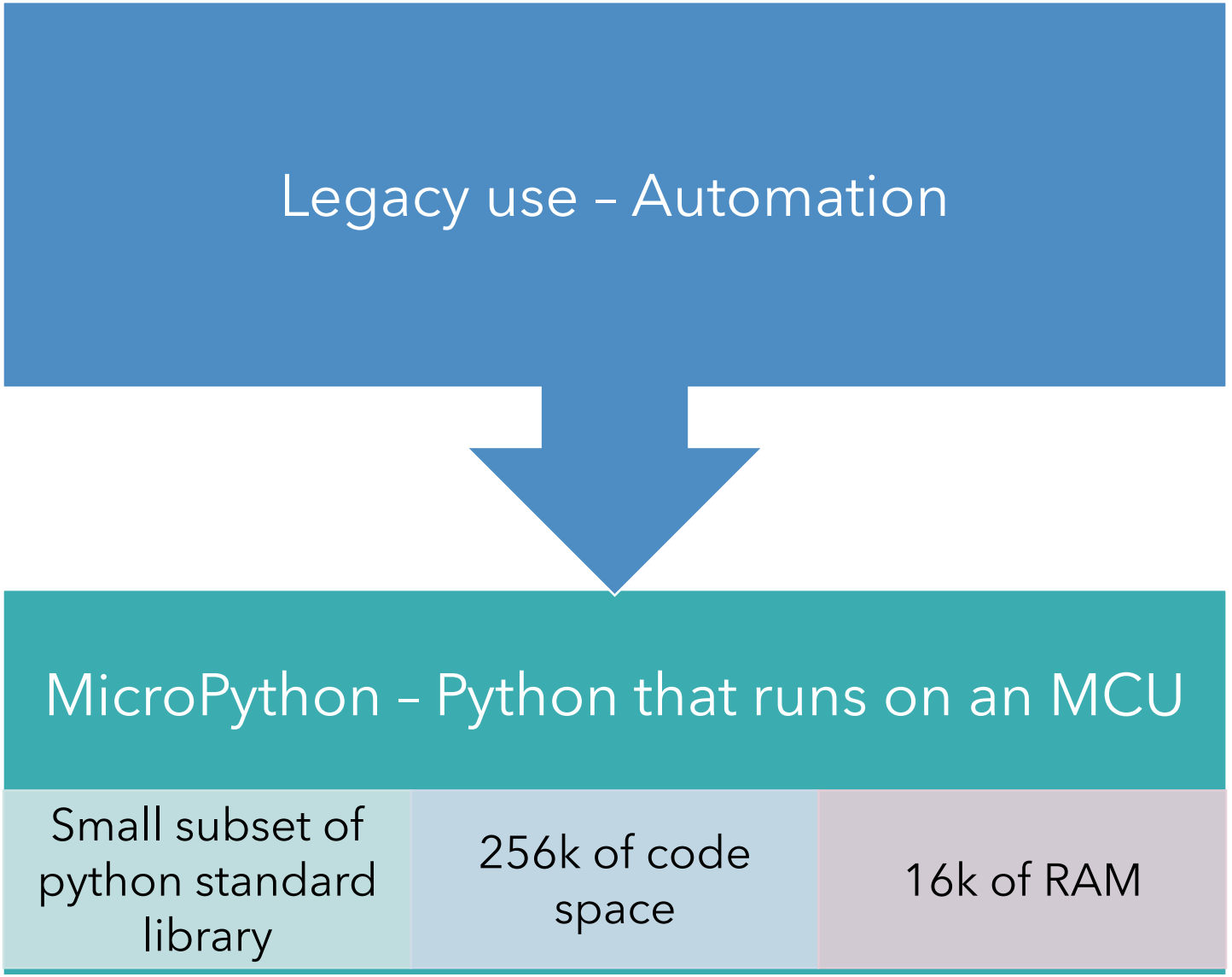
On chip and off-chip connectivity

Distributed sensor systems

Python for embedded systems

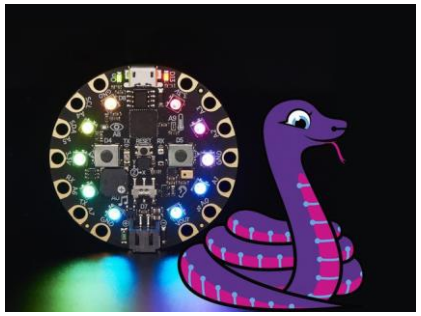


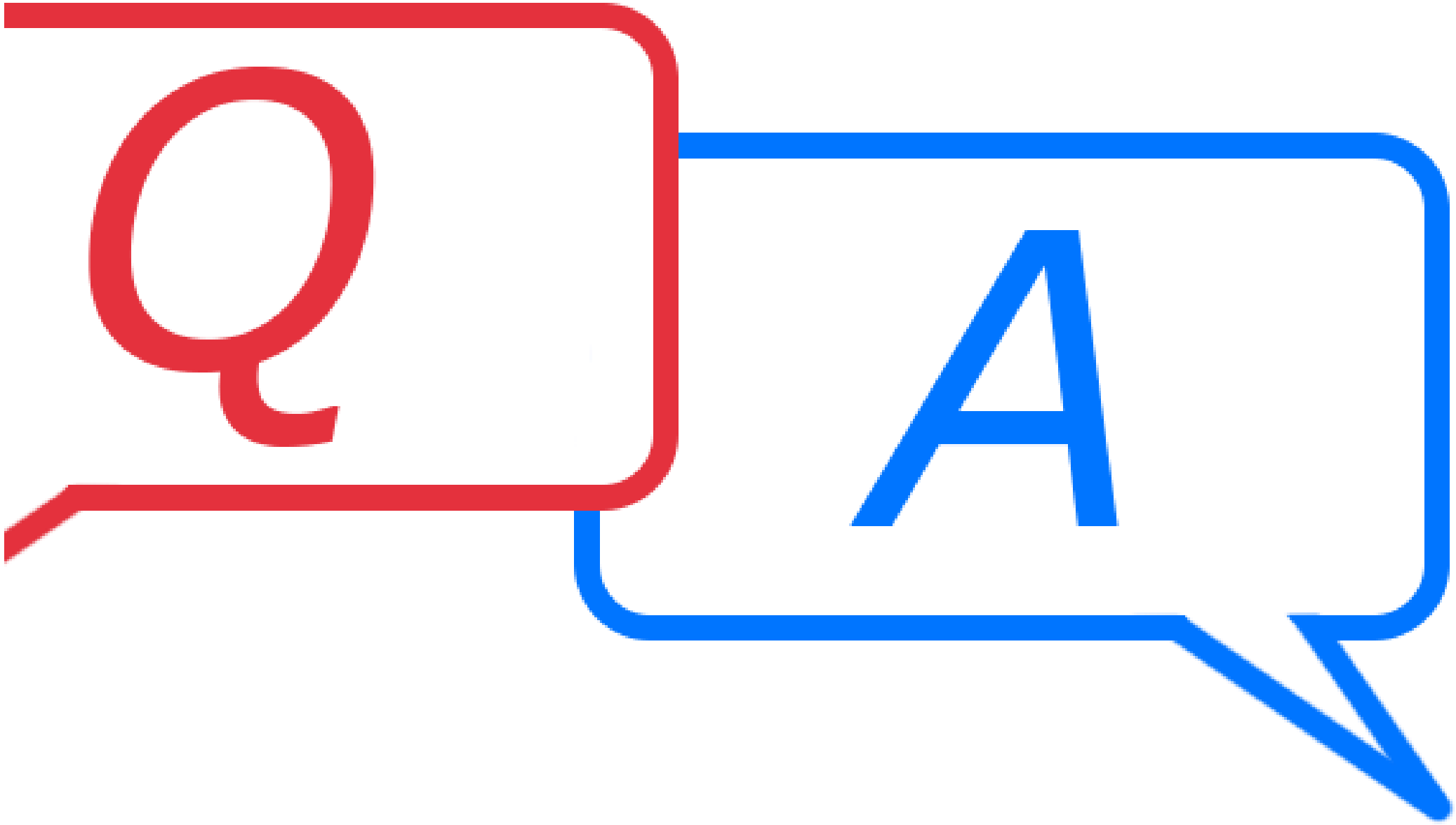
Python in the embedded systems context



Lab 6 – Circuit python simulator

See python for embedded systems in action

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