

# Helping *Pythonistas* Become Microarchitects

Using Jupyter Notebooks and CIRCT/MLIR/LLVM

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# ① Problems in Computer Architecture

## ② Section Two

Subsection 2.1

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# Problems in Computer Architecture

## Specifically with General-Purpose Processor Architectures

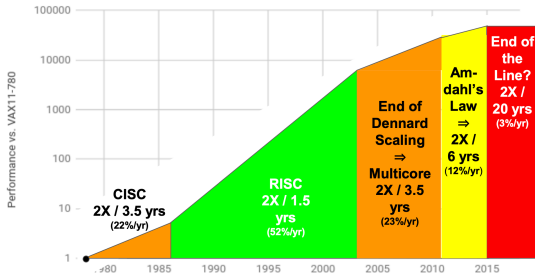
- **Memory Wall** [Wulf1995] [Hennessy1990] [Horowitz2023] [Solihin2002]
- **End of Dennard's scaling** [Dennard1974] [Haensch2006] [Chen2006] [Dennard2007] [Iwai2009] and **Power Wall** [Keshavarzi2007]

# Problems in Computer Architecture

## Specifically with General-Purpose Processor Architectures

### End of Growth of Single Program Speed?

40 years of Processor Performance



Based on SPECintCPU. Source: John Hennessy and David Patterson, Computer Architecture: A Quantitative Approach, 6/e. 2018

**Figure:** Plot of the performance of general-purpose processors over time, from 1980 till the late 2010s [Hennessy2018]



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# Slide Title 3

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Statement 1.

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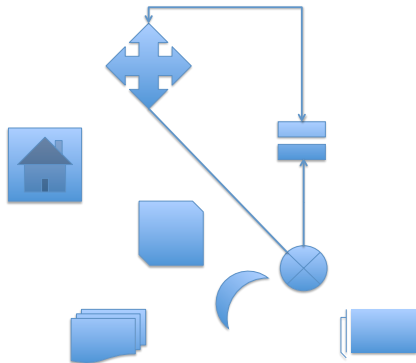


Figure: My caption [?, ?]





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Statement 1 [?].

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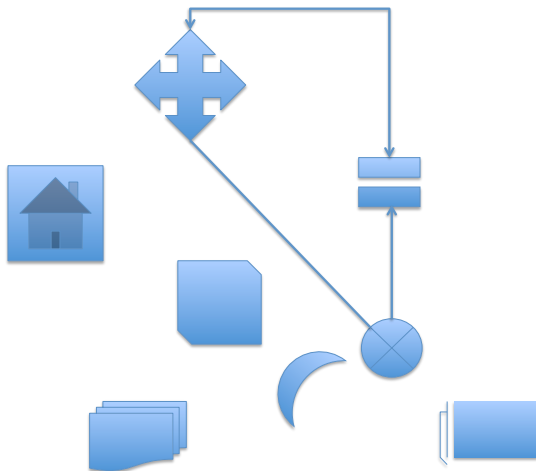
Subsection 2.1

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# References