Another look at the pWCET estimation problem

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CISTER - Research Center in
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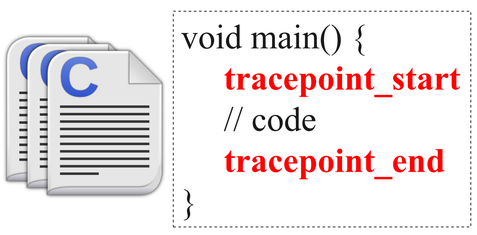
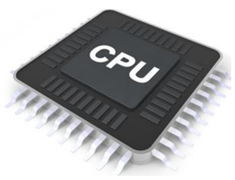
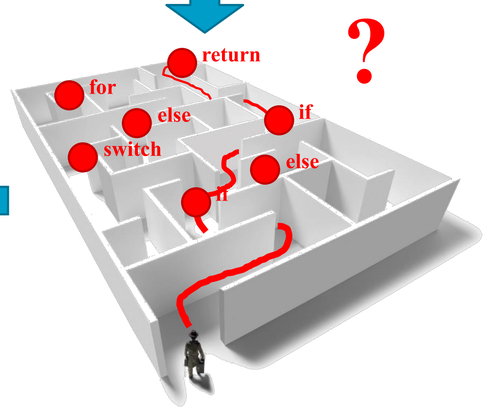
Context

- Timing-related requirements are not always a **MUST**
- If there are **not** a **MUST** then we cannot make assumptions that influence the design of the system or assume the use of design standards or properties that are specific to safety-critical systems
- In short, if the timing-related requirements are not crucial to the project then we must deal with whatever execution environment is given.

Measurement-based techniques & Limitation







Run	#cycle
1	108k
2	105k
3	97k
4	304k
5	58k
6	271k
7	87k

Descriptive statistics summarize the data and provide a nice way to Display them

Run	#cycle
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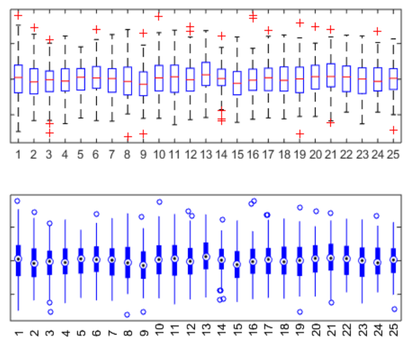
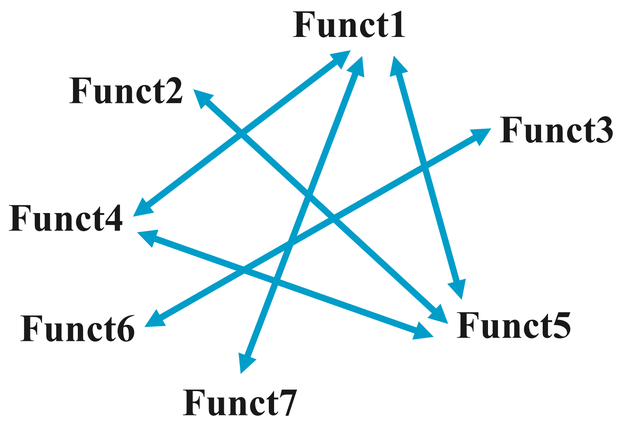


Run	input	Funct2	Funct3	Funct4	Funct5	Funct5	Funct6	...
1	1	108	56	12	21	756	245	...
2	1	105	57	12	21	732	245	...
3	2	97	89	12	54	201	316	...
4	2	95	90	12	54	203	315	...
5	3	58	8	12	106	546	78	...
6	3	271	7	12	106	514	80	...
...	...	...	...	...	...	...	...	...

+ Number of instructions of each function
+ Number of accesses to L1, L2, and L3 caches
+ Number of packets sent/received
+ etc

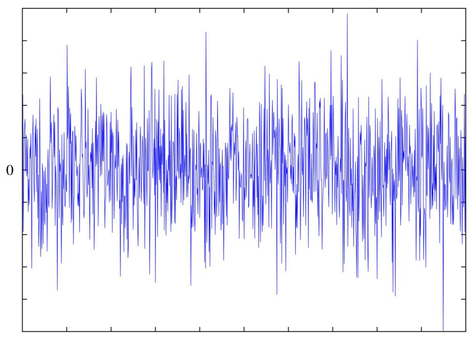
Correlation between function execution times



How to capture these correlations?

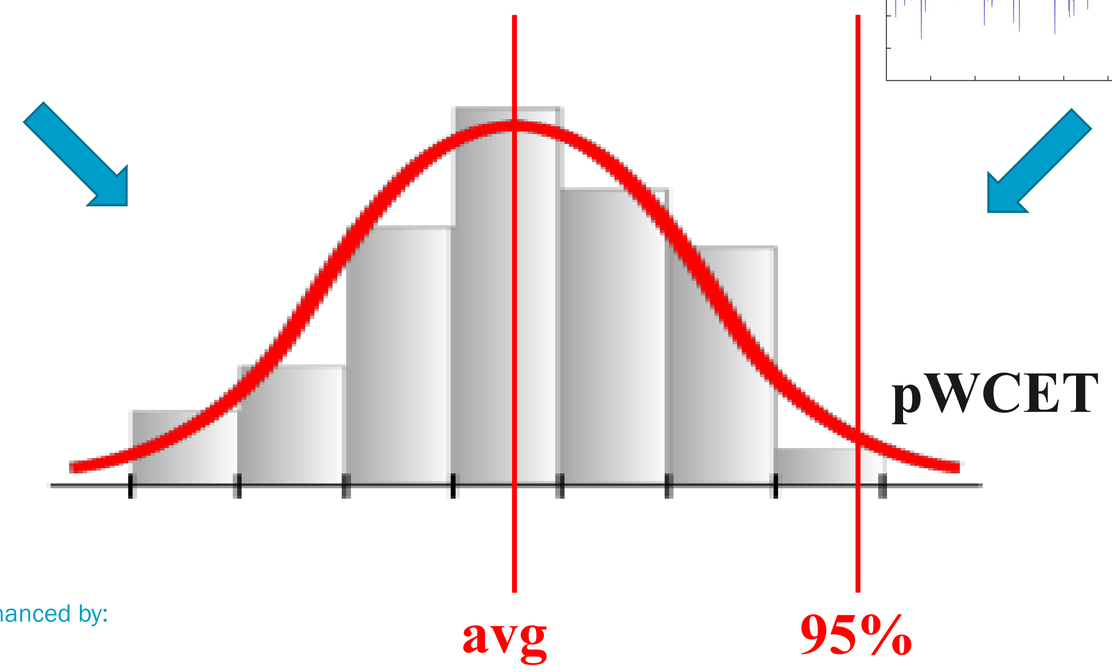
- Parametric / Non-parametric copulas
- Linear / Non-linear regression
- Bayesian networks
- ???

Characterisation of the "noise"



How to model it?

- Descriptive statistic?



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