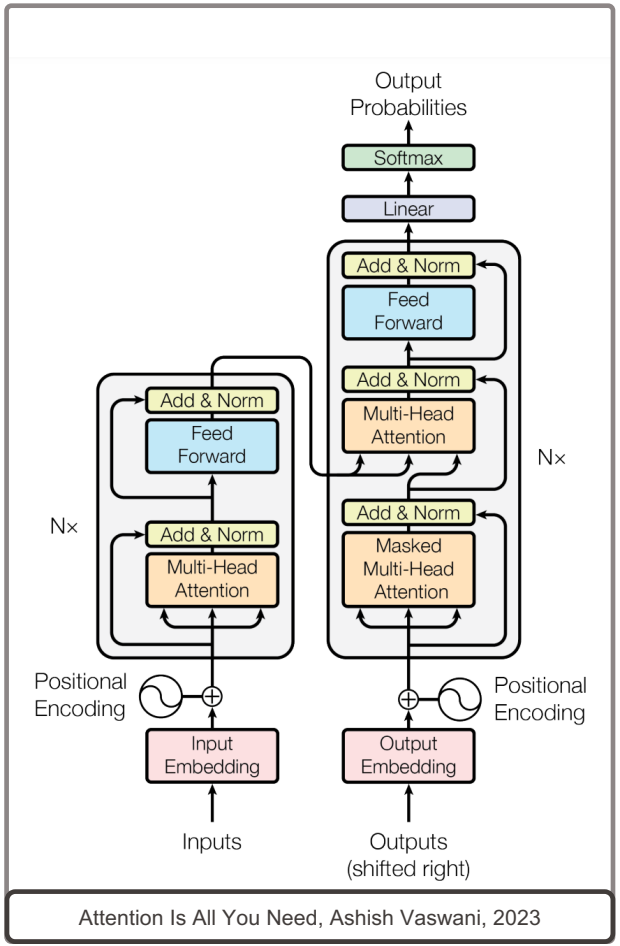
Exercise 5
Transformers

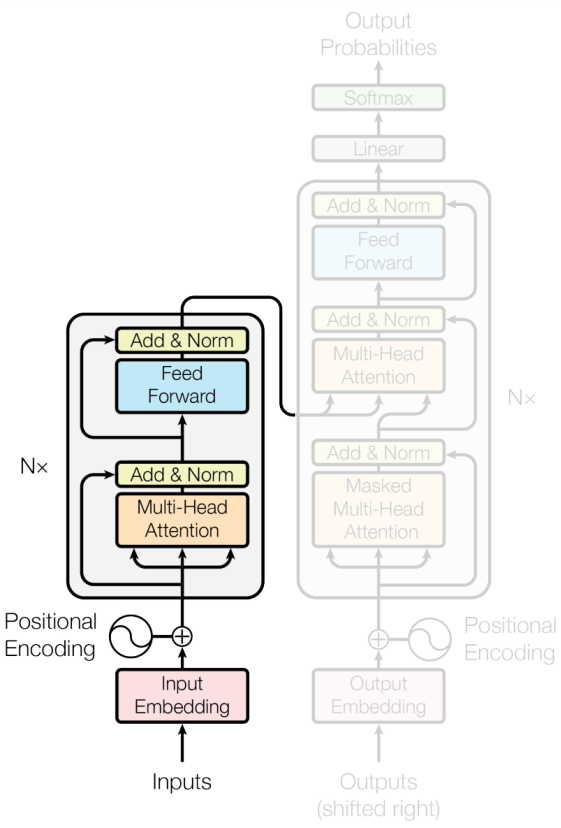
EPFL – 20.10.2023

Transformer - Recap



Attention Is All You Need, Ashish Vaswani, 2023

Transformer - Recap



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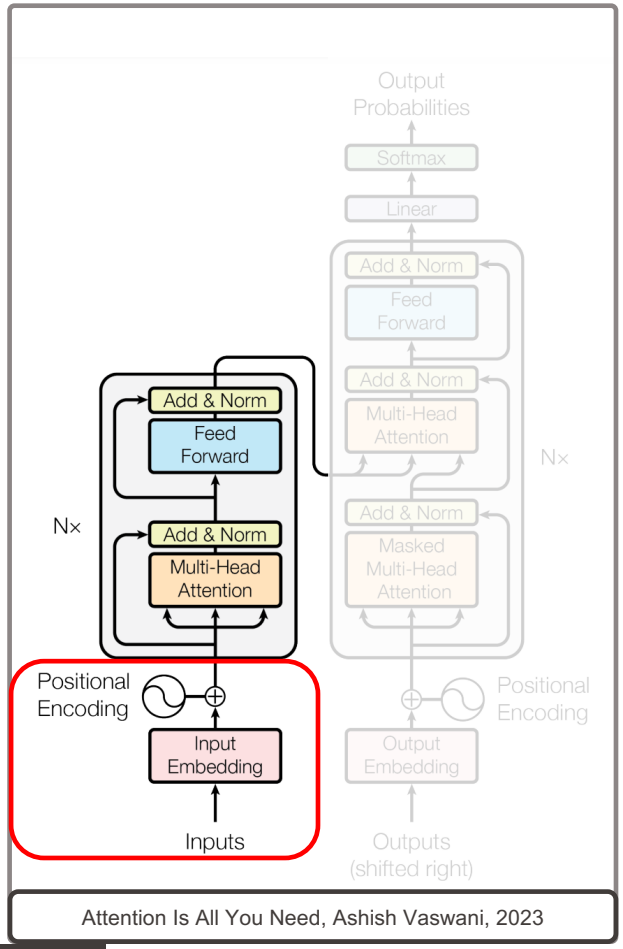

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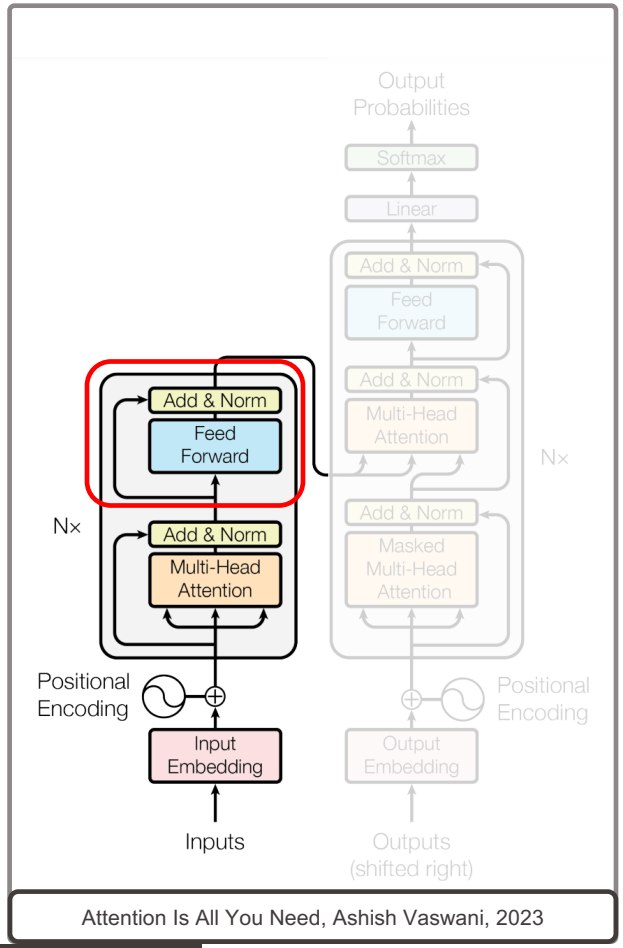

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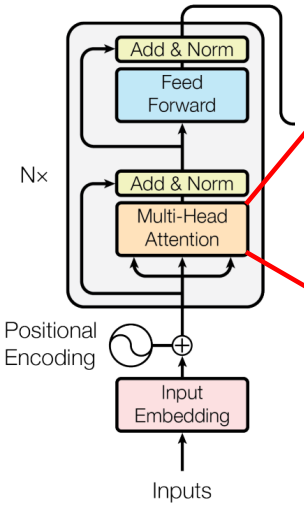

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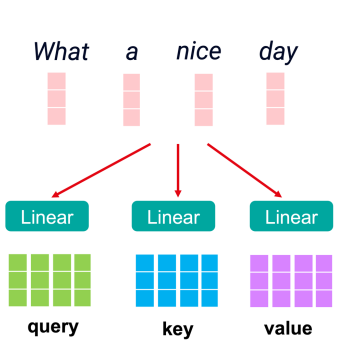
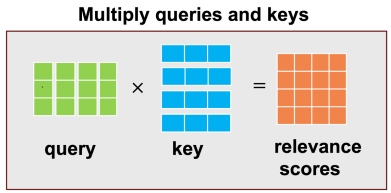
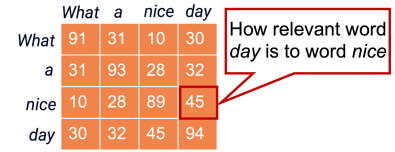
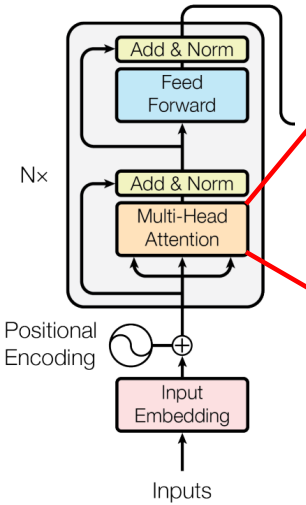






CS502: Lecture 5

Transformer - Recap



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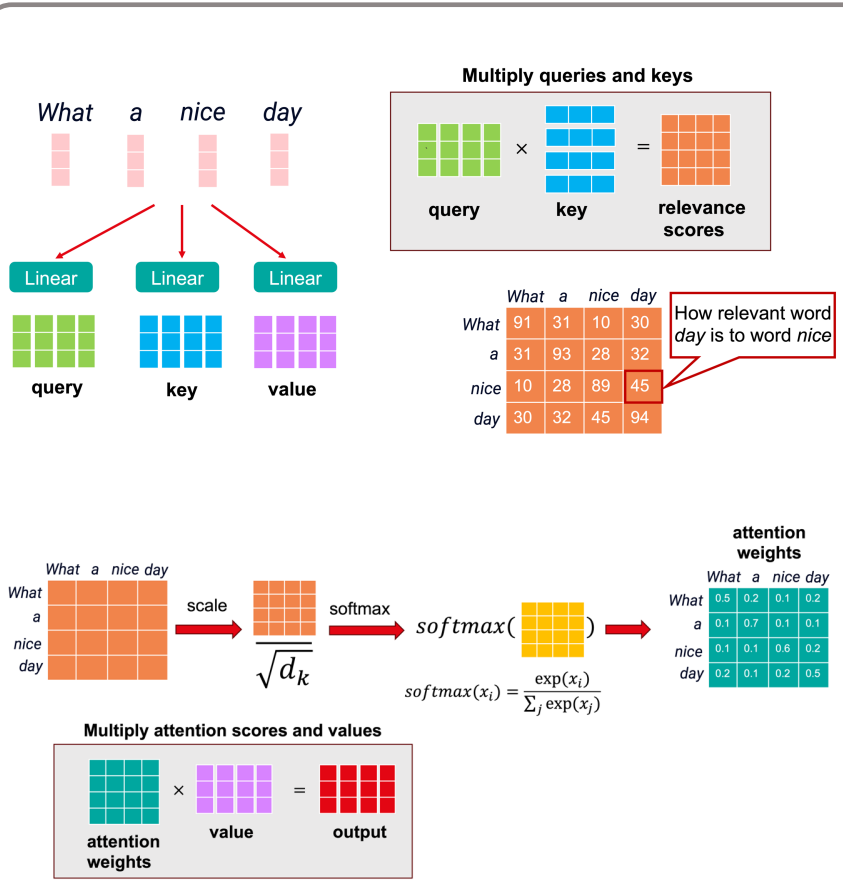
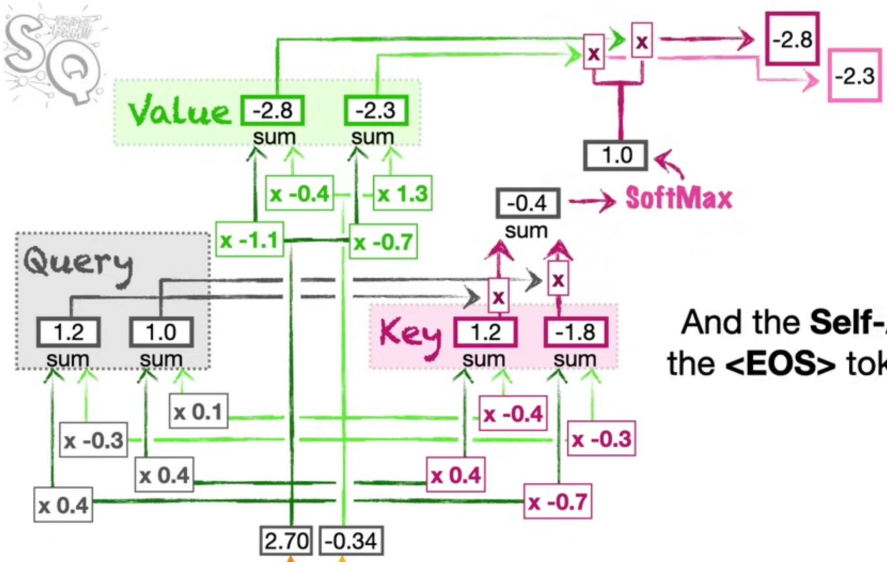


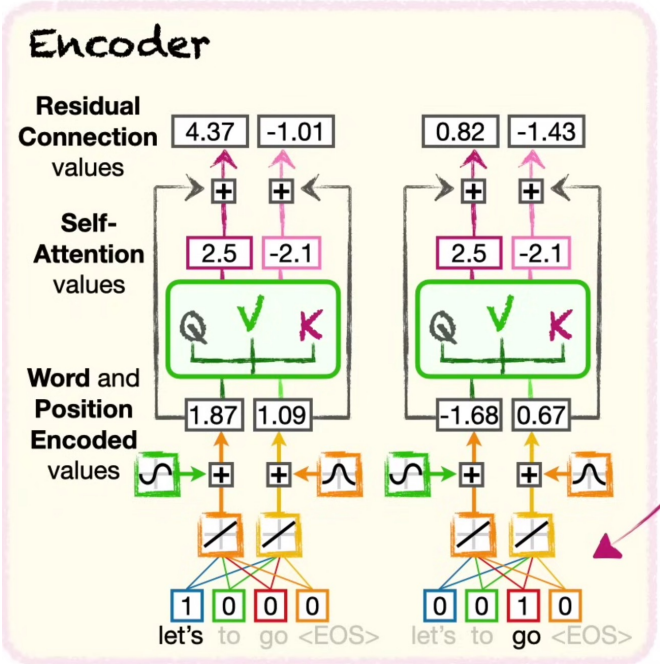
CS502: Lecture 5

Transformer

Tutorial Suggestion:

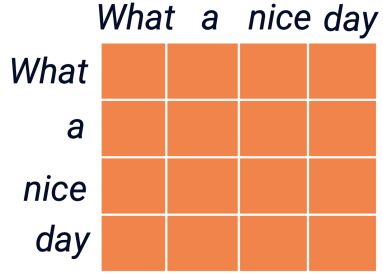
https://www.youtube.com/watch?v=zxQyTK8quyY&t=1087s





Self-Attention

Quadratic dependency on Sequence Length for Memory and Computation



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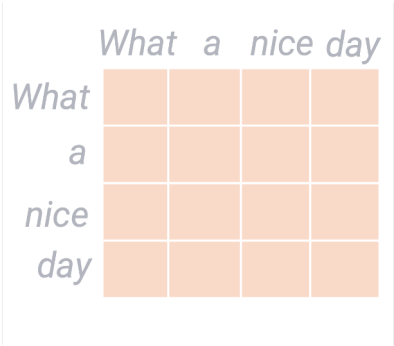

Sparse Attention

- use fixed pattern of attention to reduce number of connections

Flash Attention

- Split score matrix into blocks
- Recompute attention matrix

Longformer

- local attention for most tokens
- global attention for a few selected tokens

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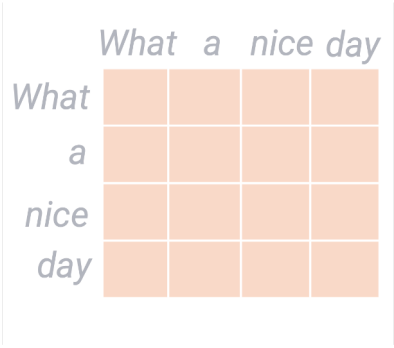

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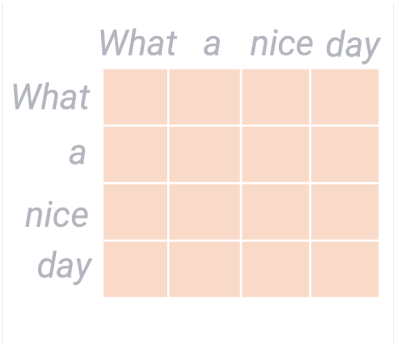

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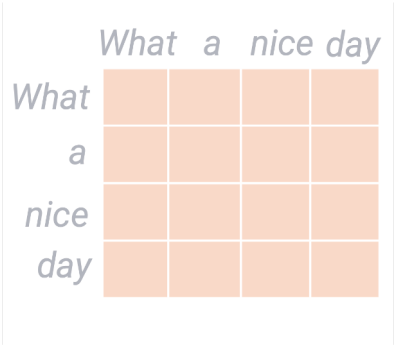

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Exercise 5

Debugging Tips - 1

Memory Usage

Which parameters impact the model's memory usage?

Dimensions Mismatch

How are input and output dimensions defined in a transformer?

Training and Evaluation Metrics

Are the metrics behaving as expected?

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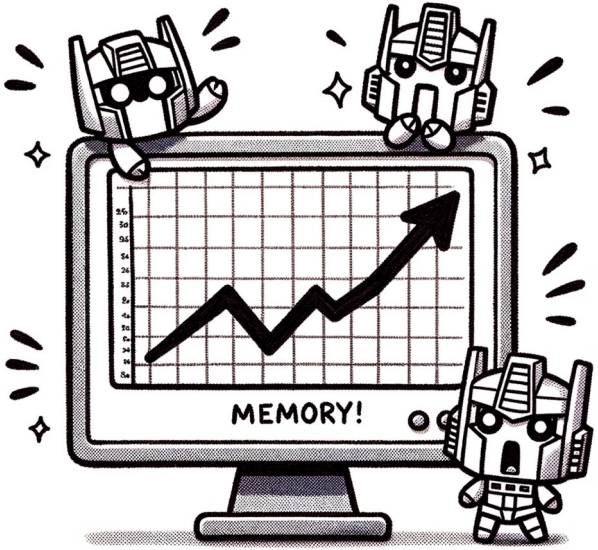

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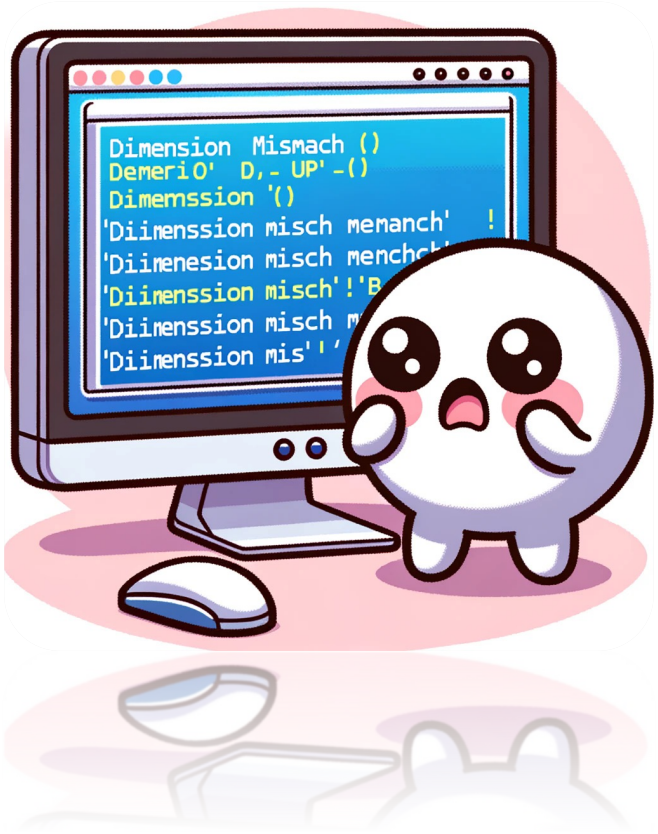

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Debugging Tips - 2

Start Small

We provide you a Debug and Run mode

Performance Indicator

Expect a training perplexity around 20 after 50 epochs

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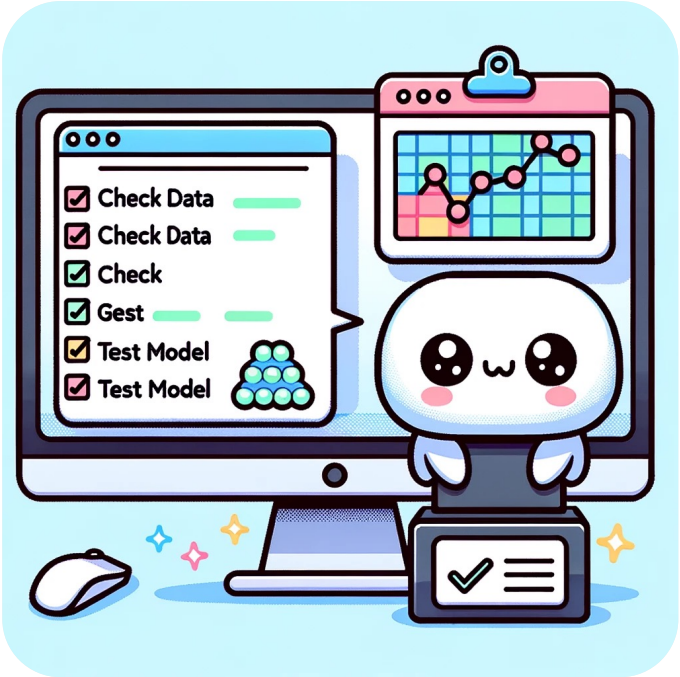

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