

# 19. Melody generation with transformers

## *Generative Music AI*

THE **SOUND** OF AI



Universitat  
Pompeu Fabra  
Barcelona

**MTG**  
Music Technology  
Group

# Implementation tools

---



# Implementation

---

1. `train.py`

# Implementation

---

1. `train.py`
2. `melodypreprocessor.py`

# Implementation

---

1. `train.py`
2. `melodypreprocessor.py`
3. `transformer.py`

# Implementation

---

1. train.py
2. melodypreprocessor.py
3. transformer.py
4. melodygenerator.py

# Implementation

---

1. train.py
2. melodypreprocessor.py
3. transformer.py
4. melodygenerator.py
5. datasat.json

# Data prep + inference

---

MelodyPreprocessor

—

*create\_training\_dataset()*

MelodyGenerator

—

*generate()*



# Melody encoding

---

“C4-1.0, C5-0.5, Bb4-1.5, A4-1.0, G4-4.0”

# Transformer

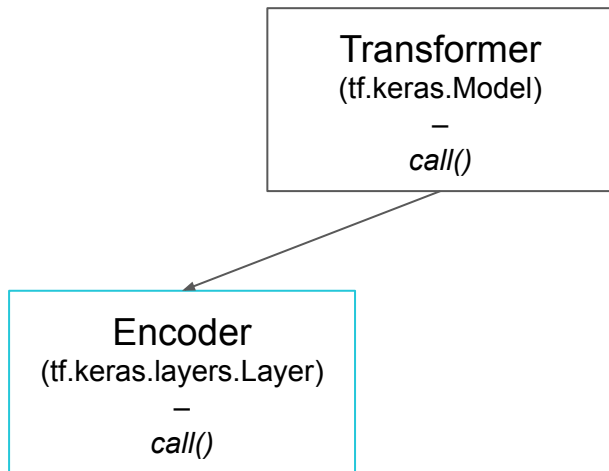
---

Transformer  
(tf.keras.Model)

—  
*call()*

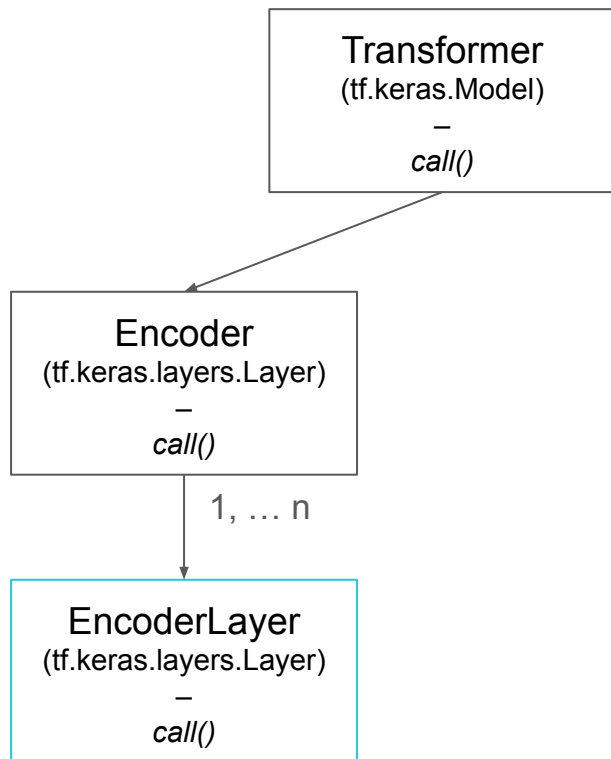
# Transformer

---



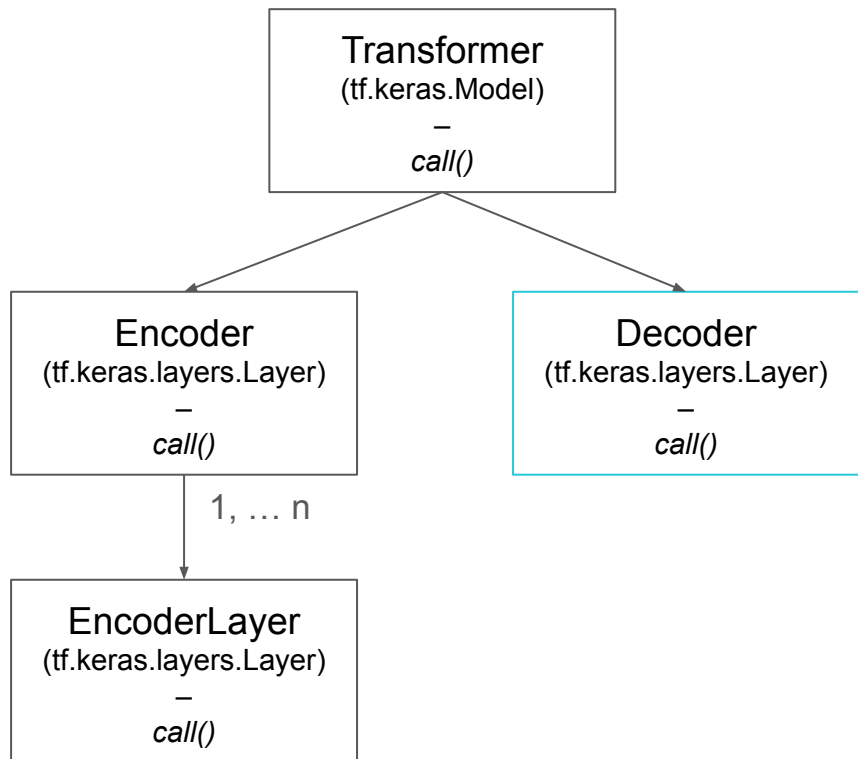
# Transformer

---



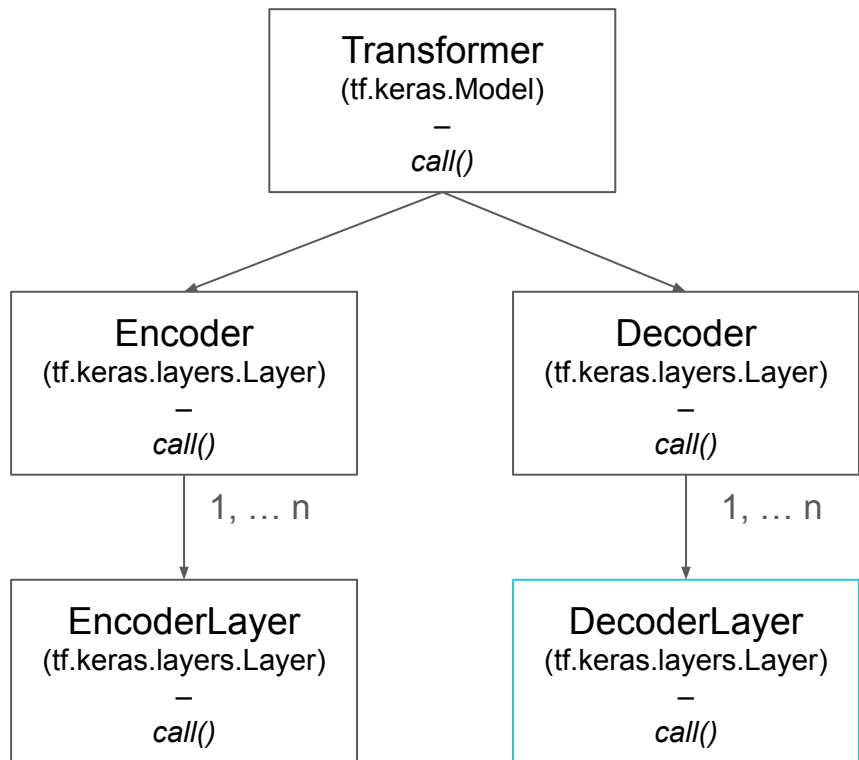
# Transformer

---



# Transformer

---



# Train script

---

1. `_calculate_loss()`
2. `_train_step()`
3. `train()`

# Train script

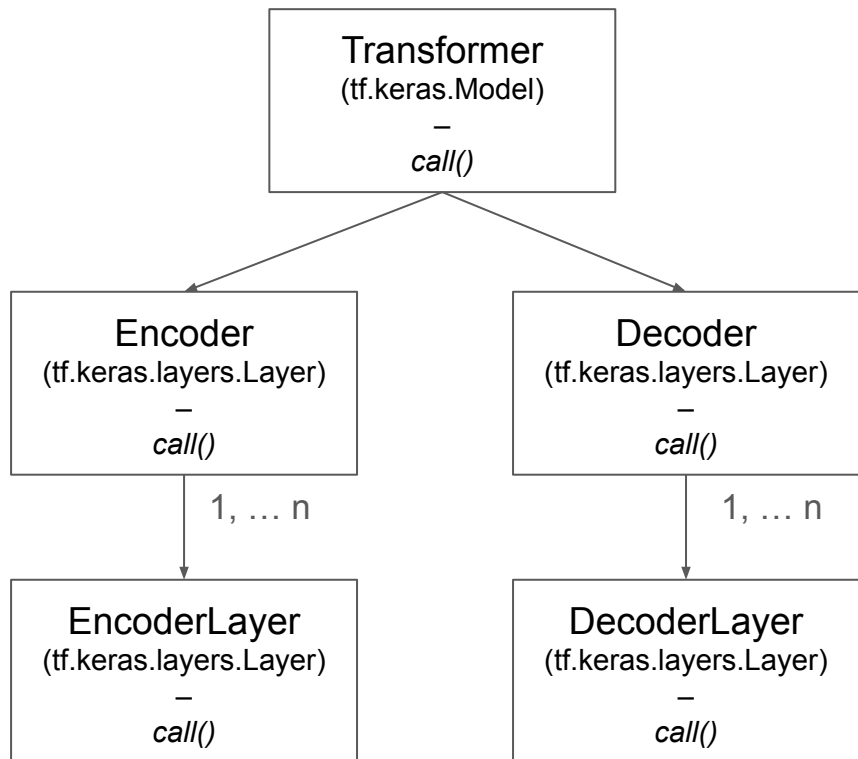
---

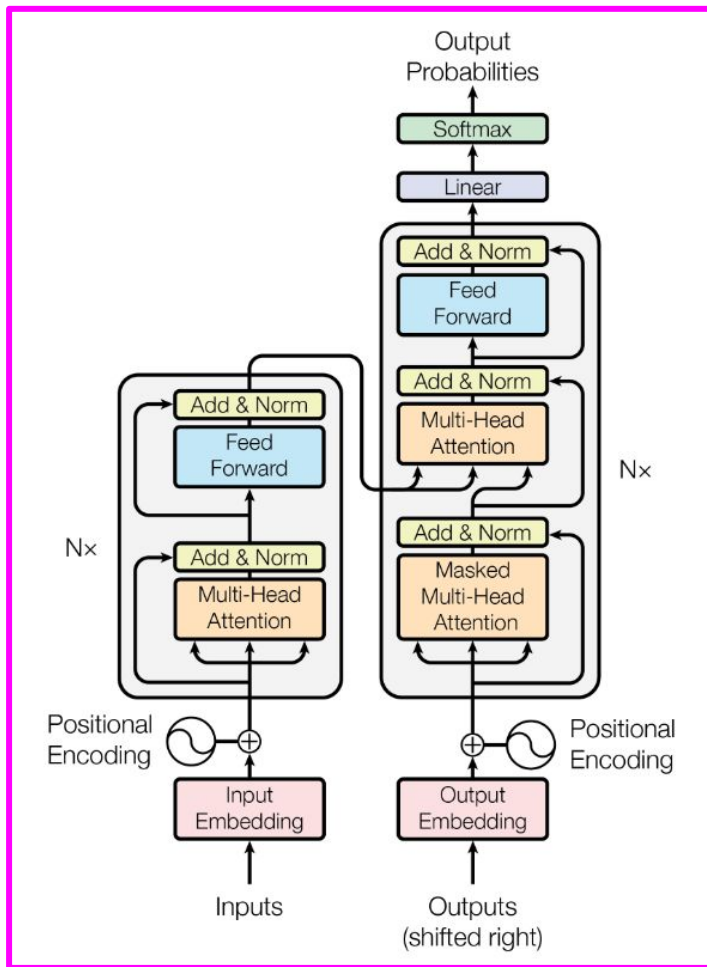
1. *\_calculate\_loss()*
2. *\_train\_step()*
3. *train()*
4. Train loop:
  - a. prepare dataset
  - b. train
  - c. make inference



# Transformer

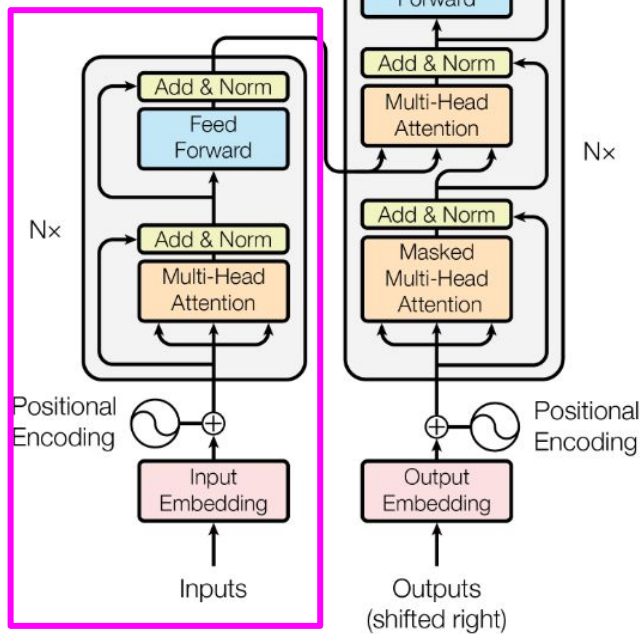
---



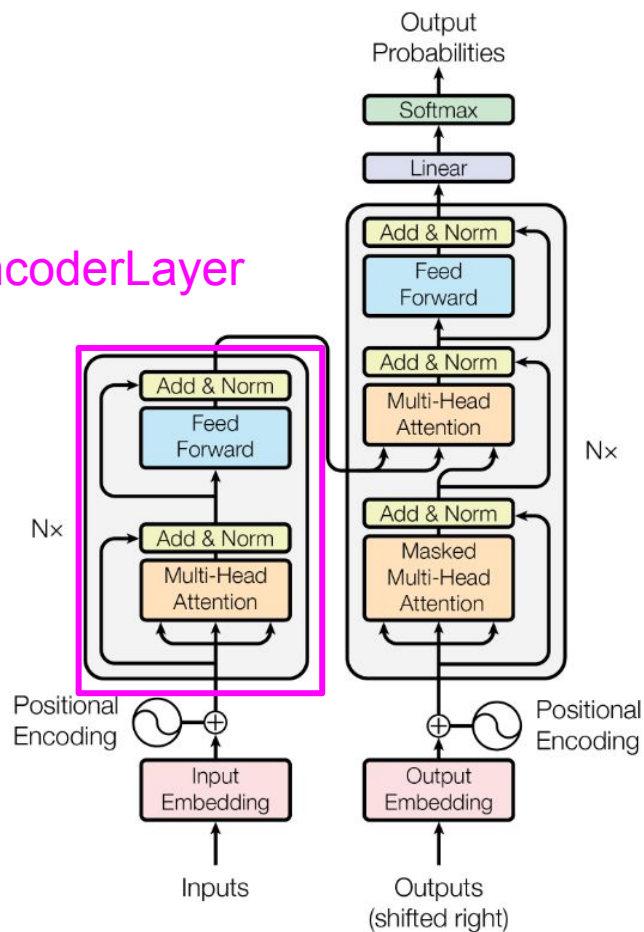


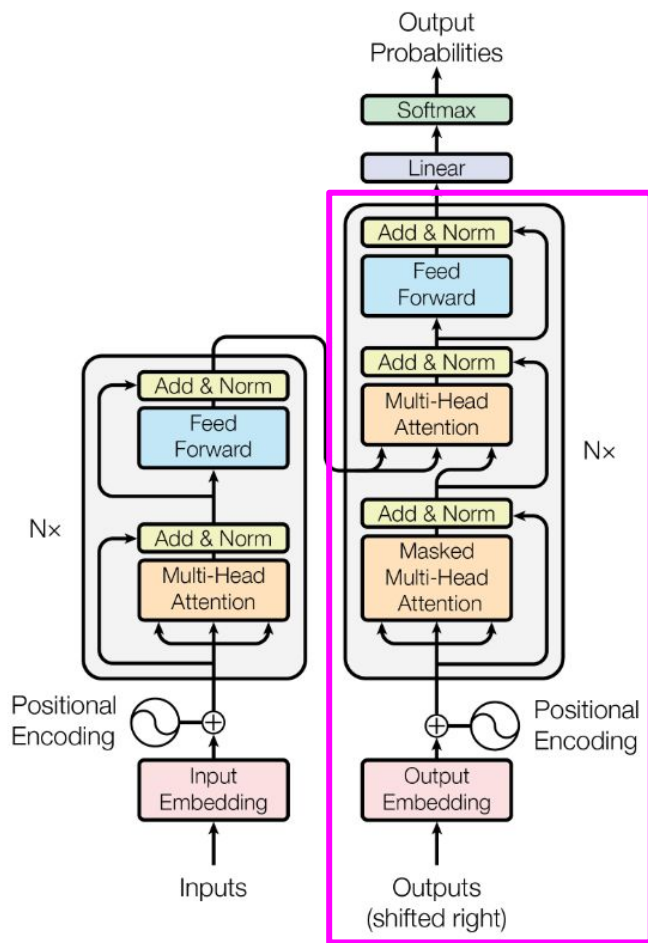
Transformer

## Encoder

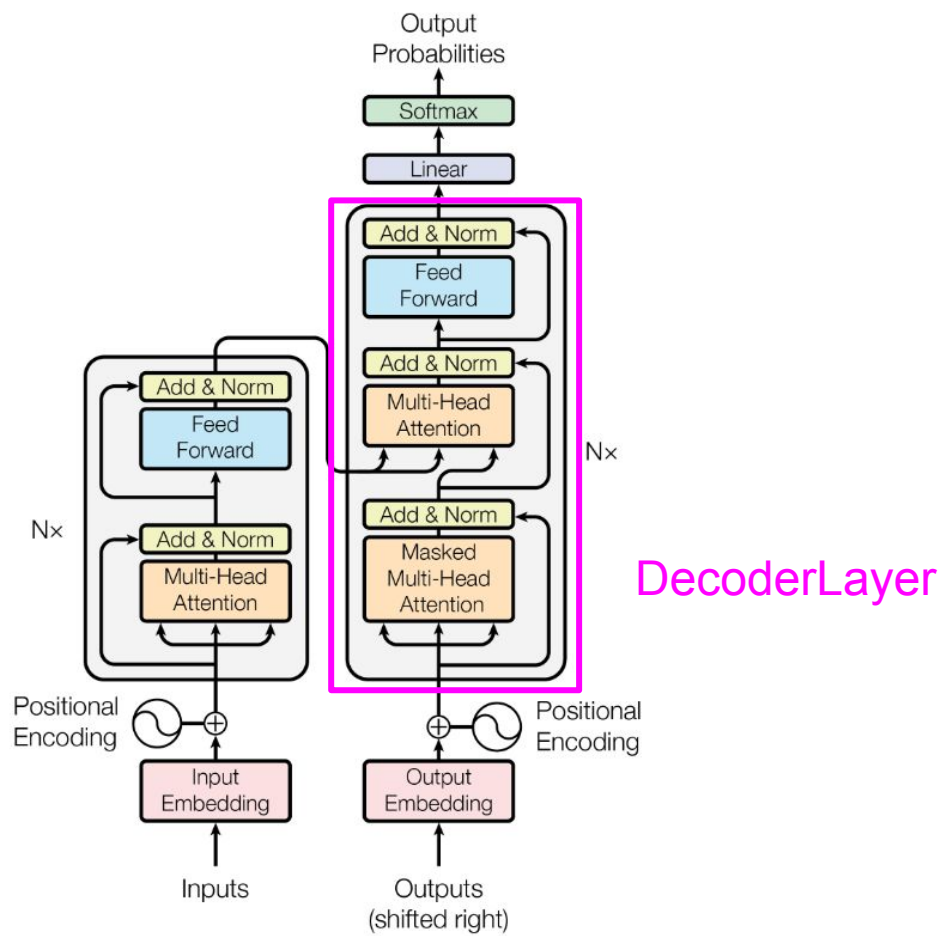


## EncoderLayer





Decoder



# Exploration

---

- Train with serious melody dataset  
(e.g., [Essen](#))

# Exploration

---

- Train with serious melody dataset  
(e.g., Essen)
- Play around with generation / seeds



# Exploration

---

- Train with serious melody dataset (e.g., Essen)
- Play around with generation / seeds
- Implement padding + look-ahead masks

# Exploration

---

- Train with serious melody dataset (e.g., Essen)
- Play around with generation / seeds
- Implement padding + look-ahead masks
- Chord generation

# Exploration

---

- Train with serious melody dataset (e.g., Essen)
- Play around with generation / seeds
- Implement padding + look-ahead masks
- Chord generation
- Condition melody generation on metadata

# What's up next?

---

## RAVE for musicians