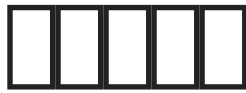


# ChatGLM3



```
## data flow
```

```
...
    query -> "[] "
    |
    tokenizer -> input_ids [6]
    |
rotary_pos_emb    embedding -> [1, 6, 4096]
  \  /
  GLMBlock x 28 -> [6, 1, 4096]  <---|
  RMSNorm      -> [6, 1, 4096]    |  final_layernorm
  [-1:]        -> [1, 1, 4096]    |
  Linear        -> [1, 1, 65024]   |  output_layer 4096->65024
  softmax       -> [1, 65024]     |
  multinomial   -> [1]             |
  cat([input_ids, next_tokens])    ---|
    ↓
tokenizer.decode( )
```

```
# GLMBlock
```

```
    input
  /      \
  / RMSNorm hidden_states -> [6, 1, 4096]
| |      /      \
| |      |      pow(2) -> [6, 1, 4096]
| |      |      |
| |      |      mean -> [6, 1, 1]
| |      |      ↓
| |      |      rsqrt( + eps) -> [6, 1, 1]
| |      \      /
| |      mul      -> [6, 1, 4096]
| |      \      weight -> [4096]
| |      \      /
| RMSNorm      mul      -> [6, 1, 4096]
```

```

|          \
| SelfAttention      x      -> [6, 1, 4096]
| |              |
| |              Linear      -> [6, 1, 4608] 4096->4608
| |              / | \
| |              q k v [6, 1, 32, 128] [6, 1, 2, 128] [6, 1, 2, 128]
| |              / | \
| |              pos_emb pos_emb \ -> cat( x0*y0-x1*y1, x1*y0-x0*y1, x, y)
| |              | | |
| |              | expand expand -> [6, 1, 32, 128] [6, 1, 32, 128]
| |              permute permute permute -> [1, 32, 6, 128] [1, 32, 6, 128] [1, 32, 6, 128]
| |              \ / |
| |      |---- matmul | -> [1, 32, 6, 128] [1, 32, 128, 6] -> [1, 32, 6, 6]
| |      | add(mask) / -> [1, 32, 6, 6]
| | attention| softmax / -> [1, 32, 6, 6] dim:-1
| |      |      \ /
| |      |---- matmul -> [1, 32, 6, 6] [1, 32, 6, 128] -> [1, 32, 6, 128] -> [6, 1, 4096]
| SelfAttention      Linear      -> [6, 1, 4096] 4096->4096
|          /
|      dropout
| \ /
|      Add
| \ \
| RMSNorm hidden_states -> [6, 1, 4096]
| | / \
| | | pow(2) -> [6, 1, 4096]
| | | |
| | | mean -> [6, 1, 1]
| | | ↓
| | | rsqrt( + eps) -> [6, 1, 1]
| | \ /
| | mul -> [6, 1, 4096]
| | \ weight -> [4096]
| | \ /
| RMSNorm      mul -> [6, 1, 4096]
| /
| mlp /
| | Linear -> [6, 1, 27392] 4096->27392
| | / \
| | chunk1 chunk0 -> [6, 1, 13696]

```

```

| | | | \
| | | | sigmoid
| | | | /
| | | mul
| | \ /
| | mul -> [6, 1, 13696]
| mlp Linear -> [6, 1, 4096] 13696->4096
| /
| dropout
| /
Add

...

```

Revision #1

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