

GCN

(Graph Convolution Network)

https://youtu.be/e_5s4uLw-d8

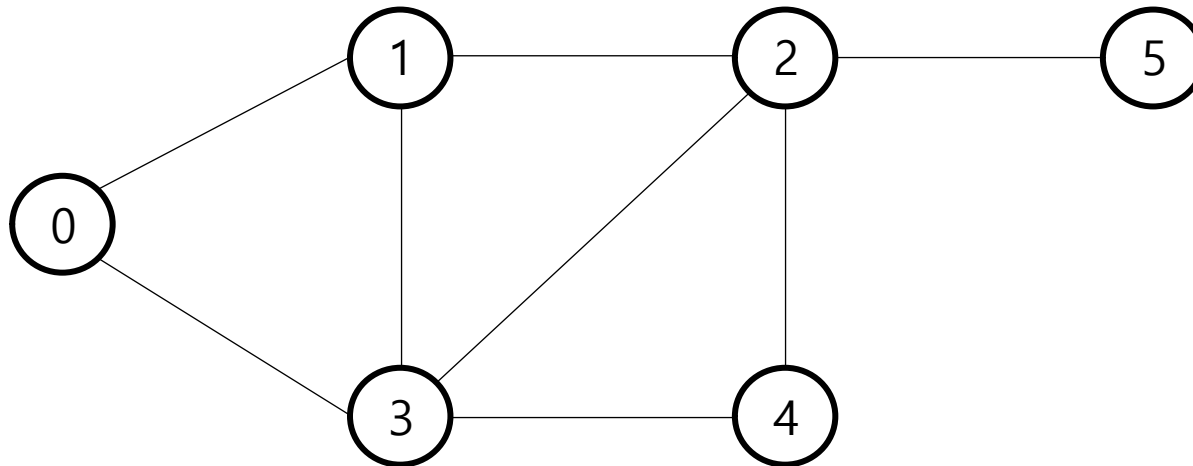
Graph란

Convolution이란

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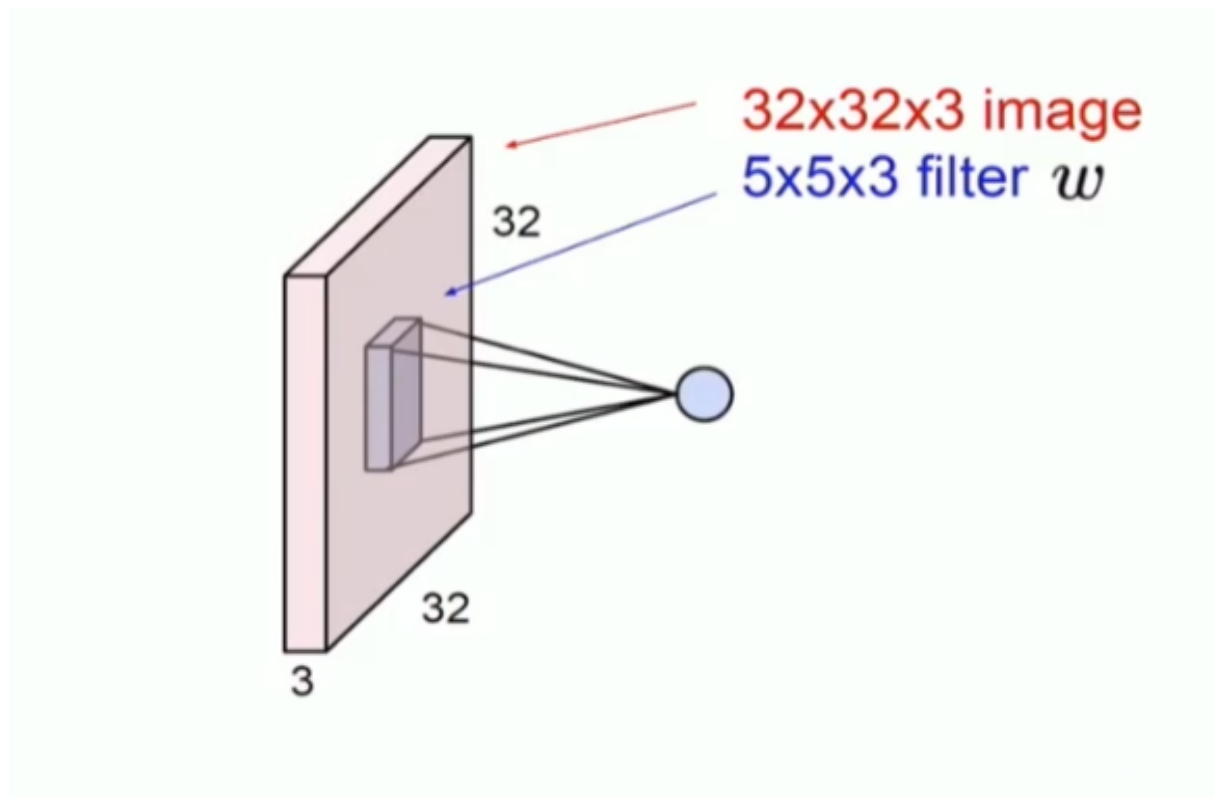
Graph란

- node와 edge로 이루어진 자료구조
 - Undirected Graph \leftrightarrow Directed Graph
 - Weighted Graph



Convolution이란

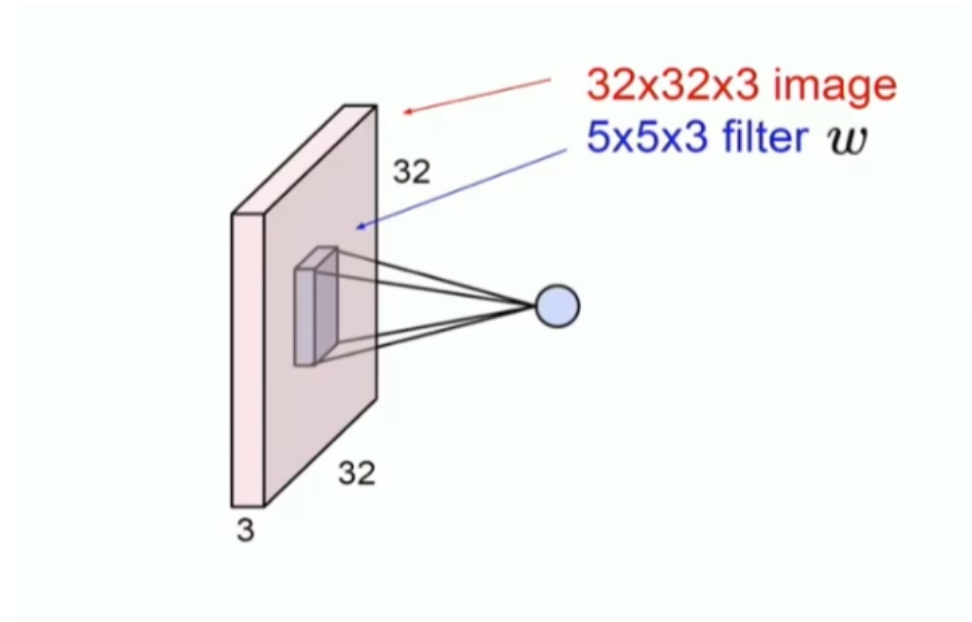
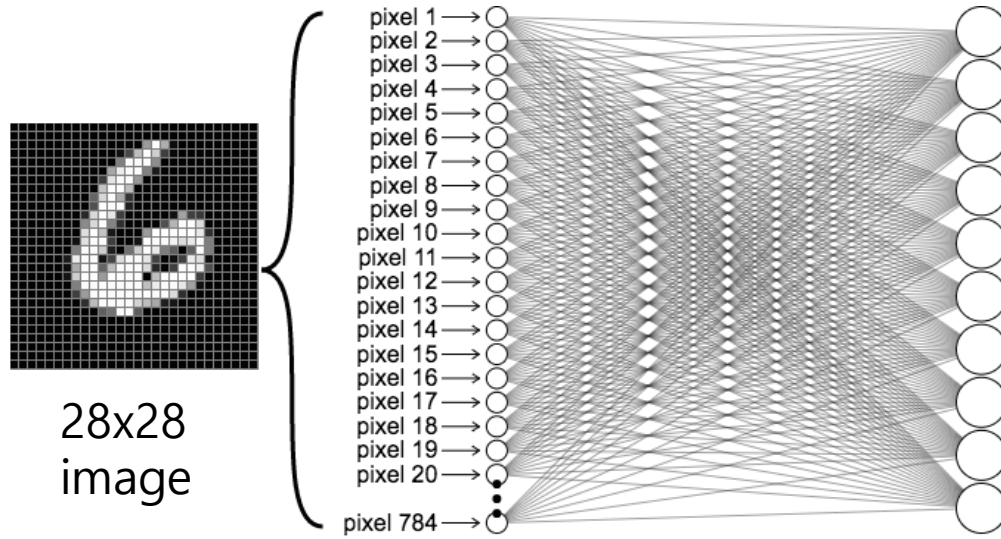
- filter를 이용하여 activation map을 업데이트 하는 layer
 - CNN의 Convolution Layer



GCN

- CNN과의 공통점
 - weight sharing
 - reduce the number of parameter
 - => less overfitting, low computational cost
 - learn local features

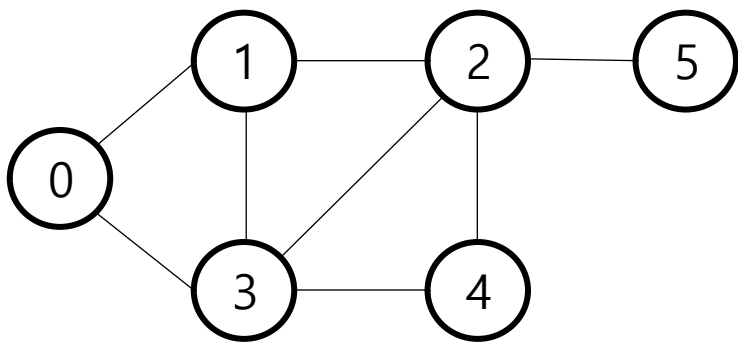
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- 목표

- Graph에서 feature를 추출하여 각 노드를 update 하는 것



	0	1	2	3	4	5
0	0	1	0	1	0	0
1	1	0	1	1	0	0
2	0	1	0	1	1	1
3	1	1	1	0	1	0
4	0	0	1	1	0	0
5	0	0	1	0	0	0

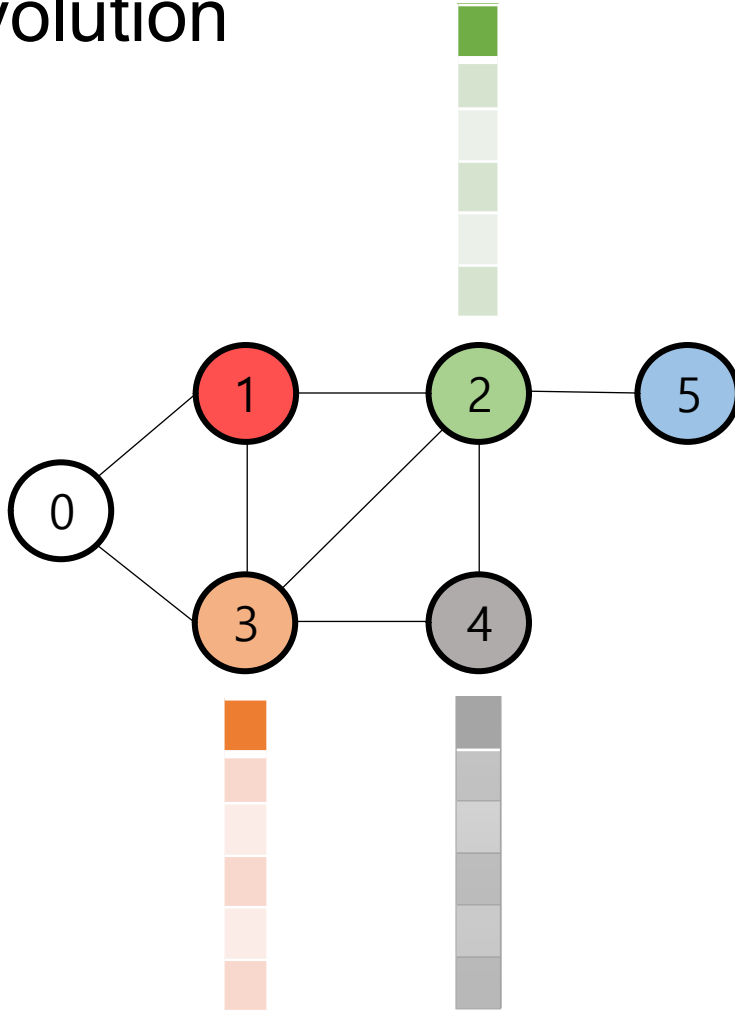
Adjacency matrix

	0	1	2	3	4
0	255	24	0	13	0
1	146	27	75	0	0
2	124	0	45	245	0
3	86	157	0	56	0
4	0	0	13	11	45
5	46	0	45	0	34

Node feature matrix

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- Convolution

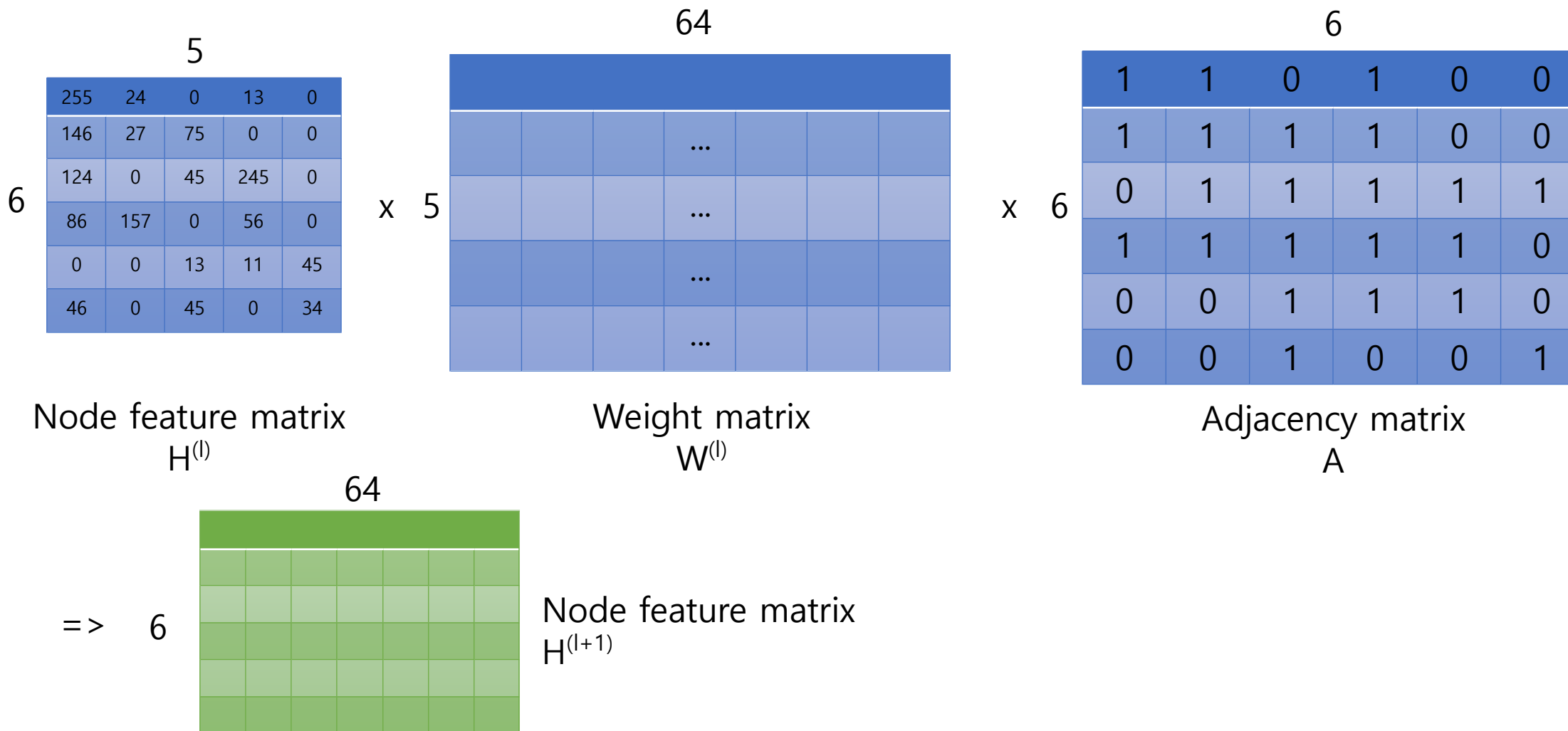


$$H_4^{(l+1)} = \sigma(H_2^{(l)}W^{(l)} + H_3^{(l)}W^{(l)} + H_4^{(l)}W^{(l)})$$

$$H^{(l+1)} = \sigma(AH^{(l)}W^{(l)})$$

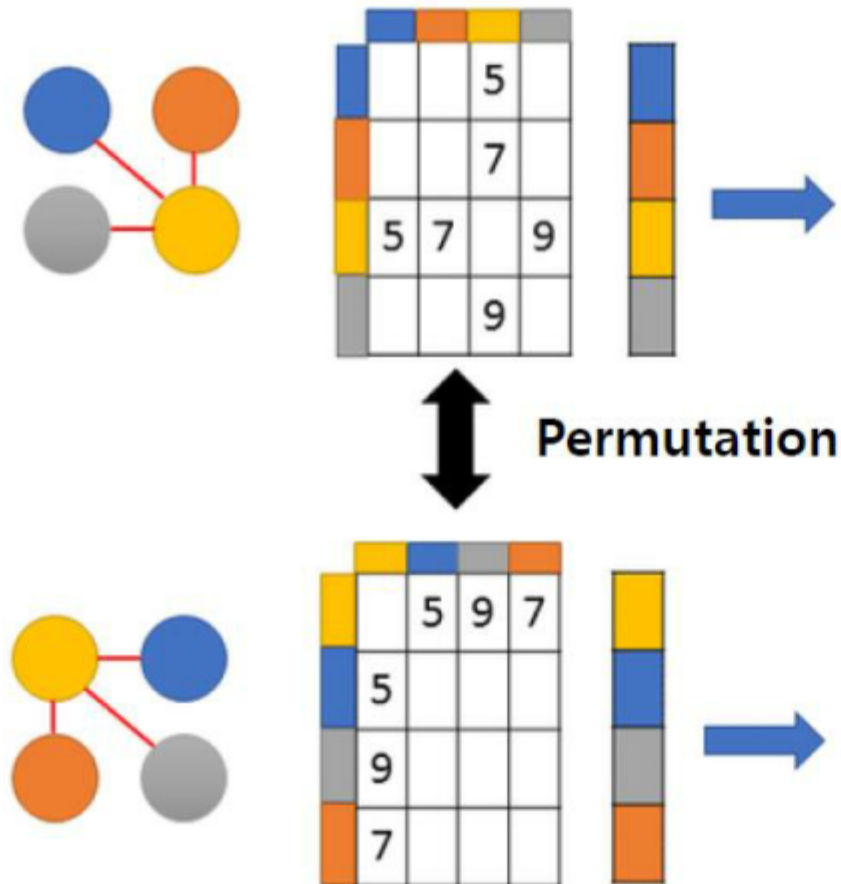
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- $H^{(l+1)} = \sigma(AH^{(l)}W^{(l)})$



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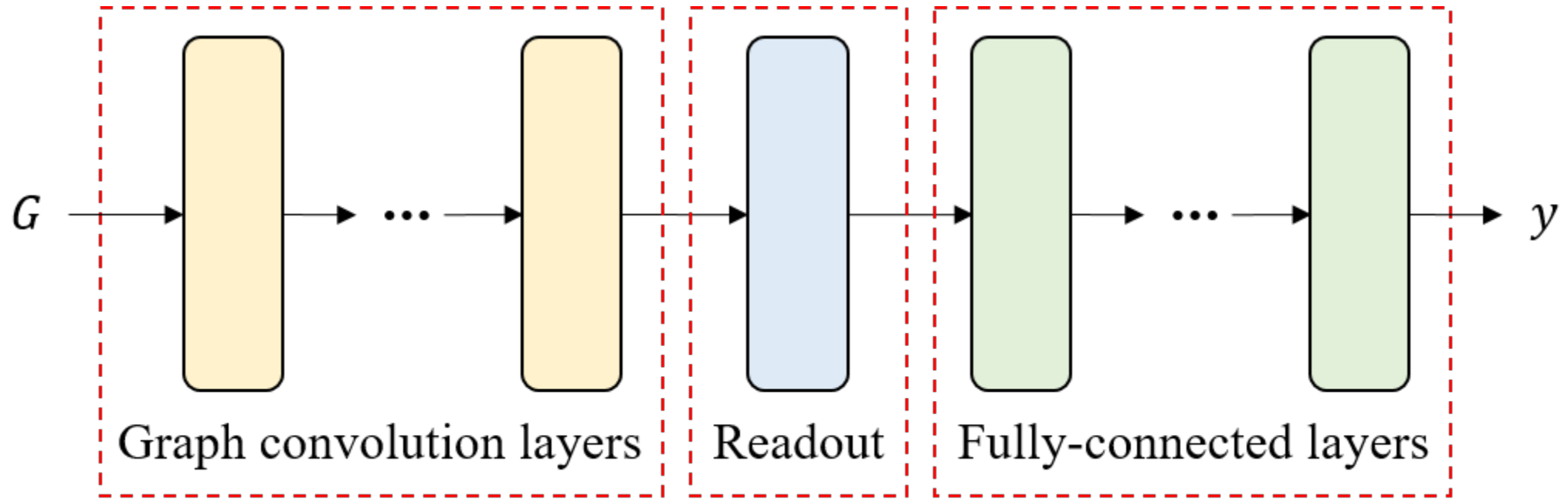
- Readout



Node-wise summation

$$z_G = \tau \left(\sum_{i \in G} MLP \left(H_i^{(L)} \right) \right)$$

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Q & A