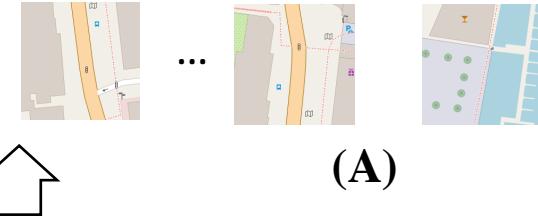


Geolocated
map tiles

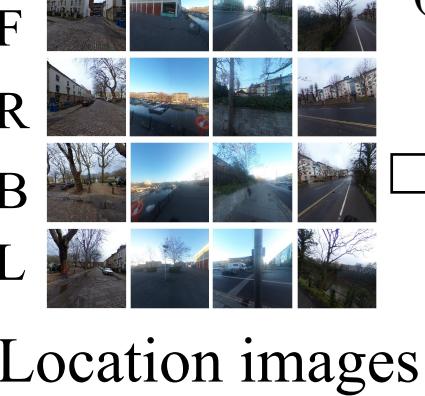


(A)

Embedded
space

(B)

Candidate route
vectors



Location images

(E)

Embedded
space

32-D embedded space vector

Query: route vector

(F)



(G)

Distance

Ranked list of
likely routes

(A)

Route
generator

Generate
candidate
route vectors

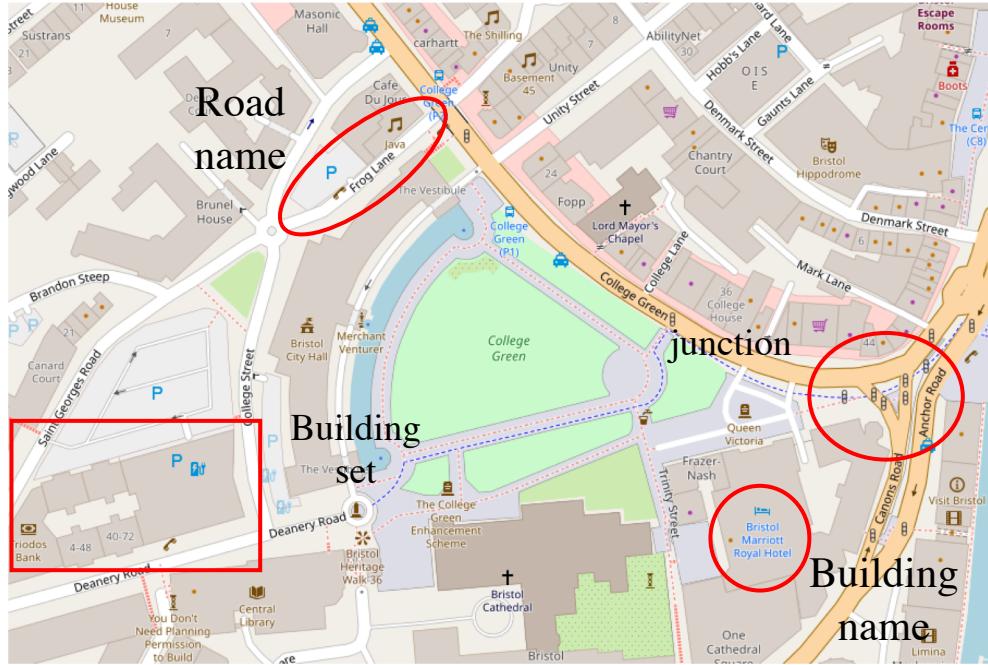
(D)

Distance

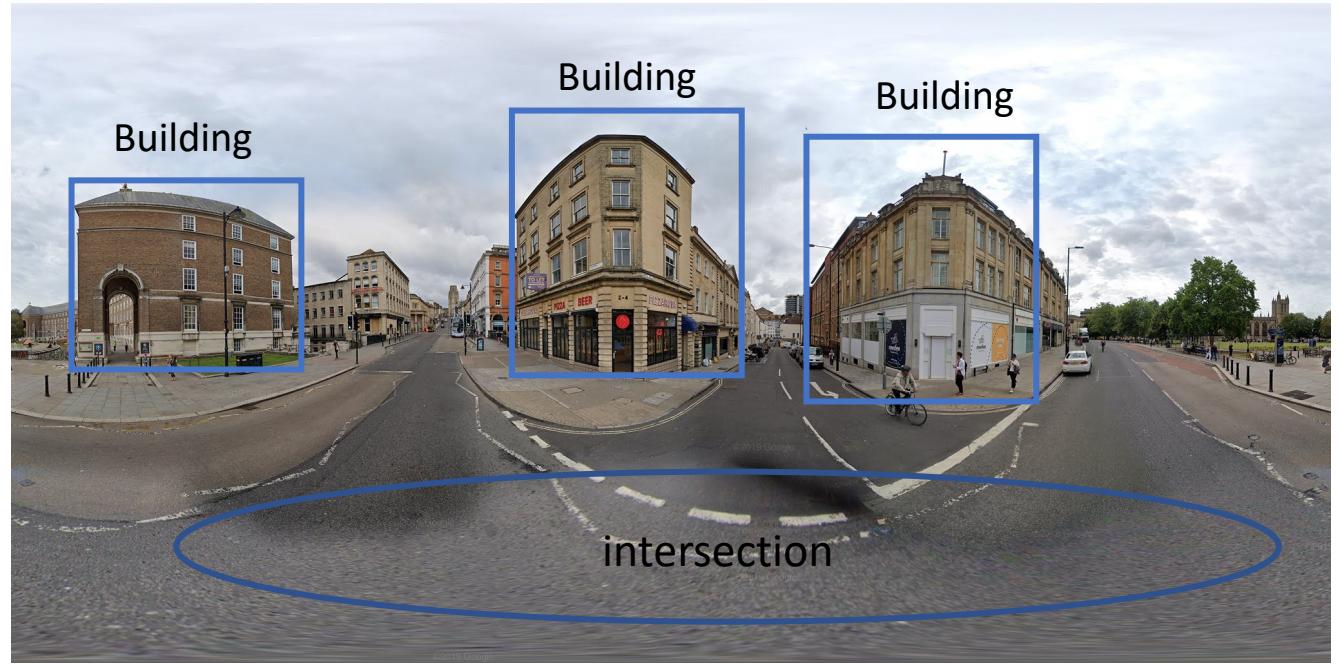


(F)

(G)

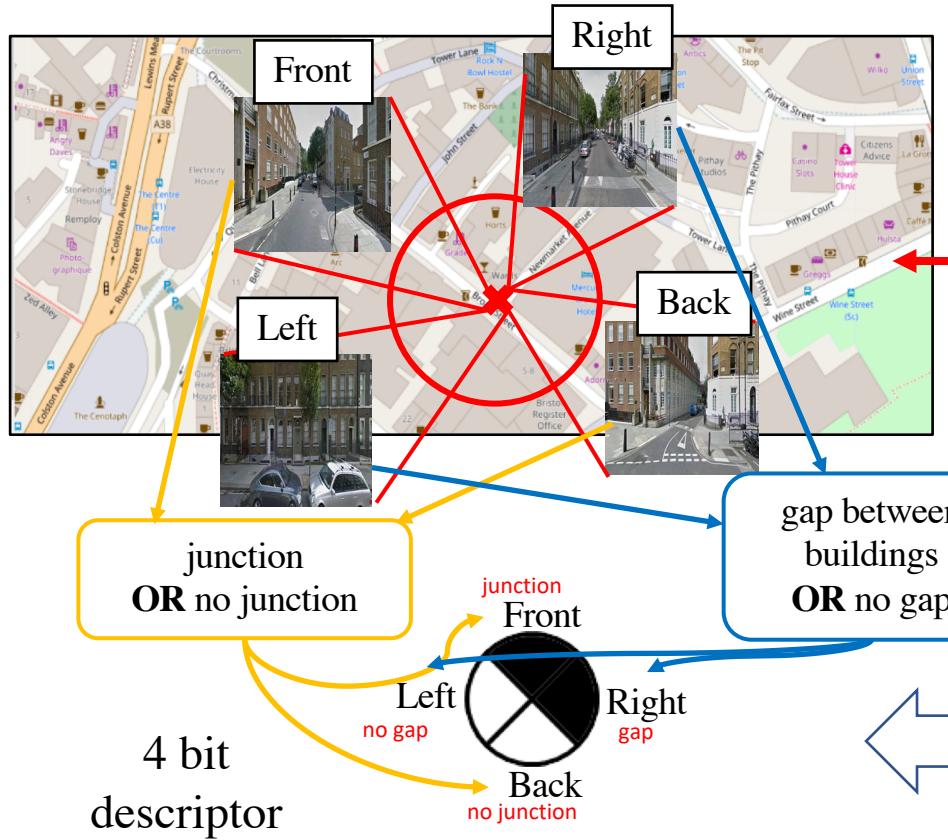


(a)

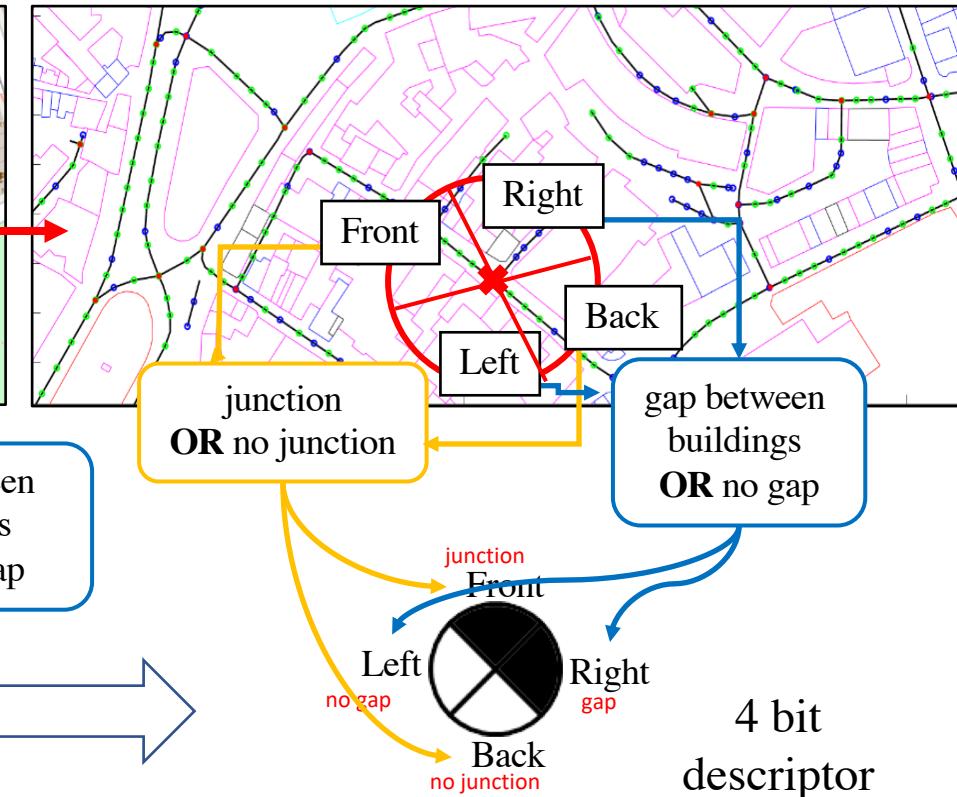


(b)

Images: Google Street View (GSV)



2D-map: Open Street Map (OSM)

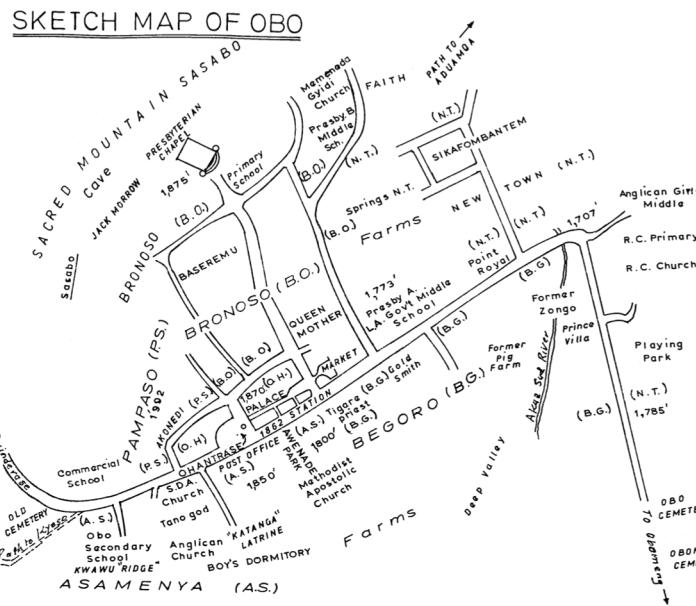


4 bit
descriptor

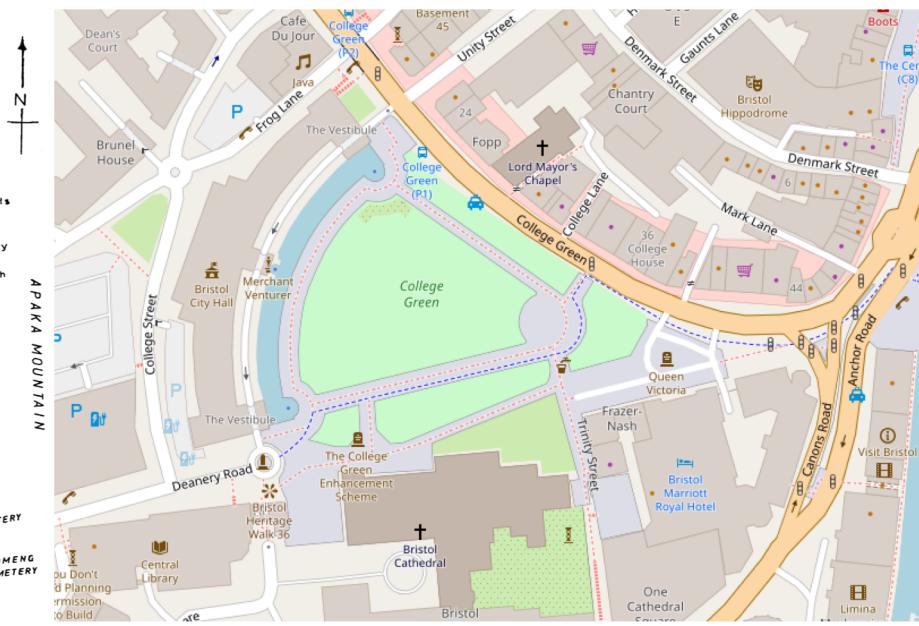
4 bit
descriptor



(a)



(b)



(c)

```
</way>
<way id="46435596" version="11" timestamp="2018-03-06T07:54:12Z" changeset="56926360">
  <nd ref="593921857"/>
  <nd ref="3998783961"/>
  <nd ref="42430685"/>
  <nd ref="3998783963"/>
  <nd ref="5458524665"/>
  <nd ref="5458524664"/>
  <nd ref="4599130021"/>
  <nd ref="4872429937"/>
  <nd ref="62915527"/>
  <tag k="hgv" v="destination"/>
  <tag k="highway" v="secondary"/>
  <tag k="name" v="West 45th Street"/>
  <tag k="oneway" v="yes"/>
```

```
<node id="593921857" lat="40.7618975" lon="-73.9948916"
```

```
<node id="42430685" lat="40.7627499" lon="-73.9969249"
      <tag k="highway" v="traffic_signals"/>
```

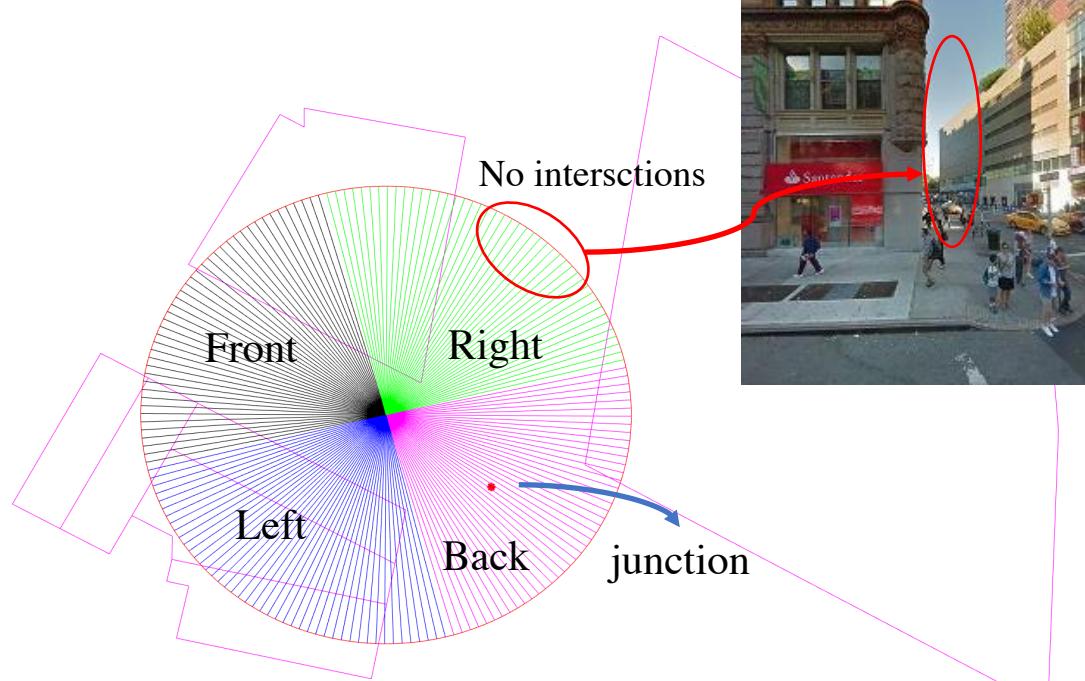
(a)

```
</way>
<way id="265260798" version="2" timestamp="2016-11-08T12:10:14Z" changeset="43485653">
  <nd ref="2709306789"/>
  <nd ref="2709306798"/>
  <nd ref="4488597391"/>
  <nd ref="2709306850"/>
  <nd ref="2709306838"/>
  <nd ref="2709306835"/>
  <nd ref="2709306789"/>
  <tag k="addr:housenumber" v="12?"/>
  <tag k="addr:postcode" v="10001"/>
  <tag k="addr:street" v="West 31st Street"/>
  <tag k="building" v="yes"/>
  <tag k="height" v="46.0"/>
  <tag k="nycdoitt:bin" v="1015793"/>
```

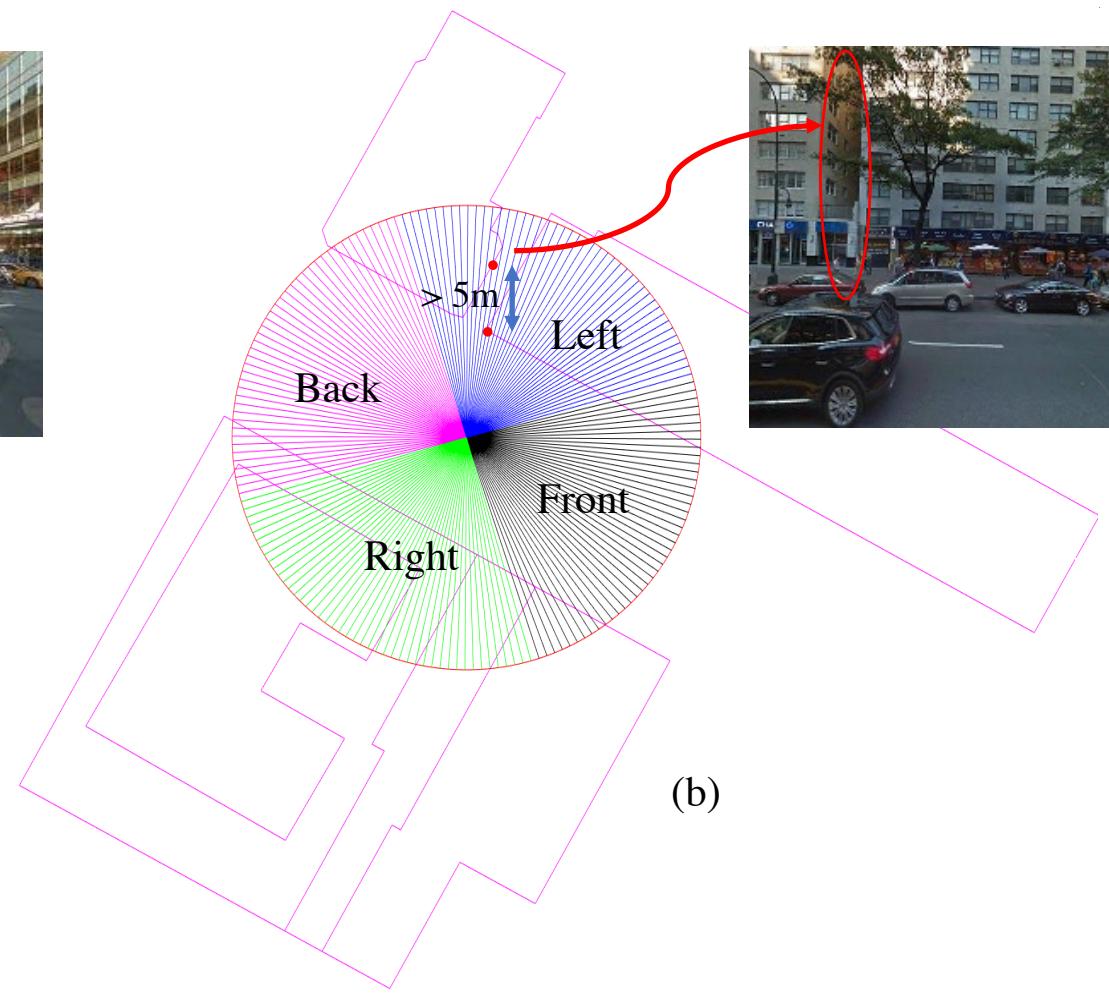
```
<node id="2709306789" lat="40.7465805" lon="-73.9869345"
```

```
<node id="2709306838" lat="40.7468008" lon="-73.9867759"
```

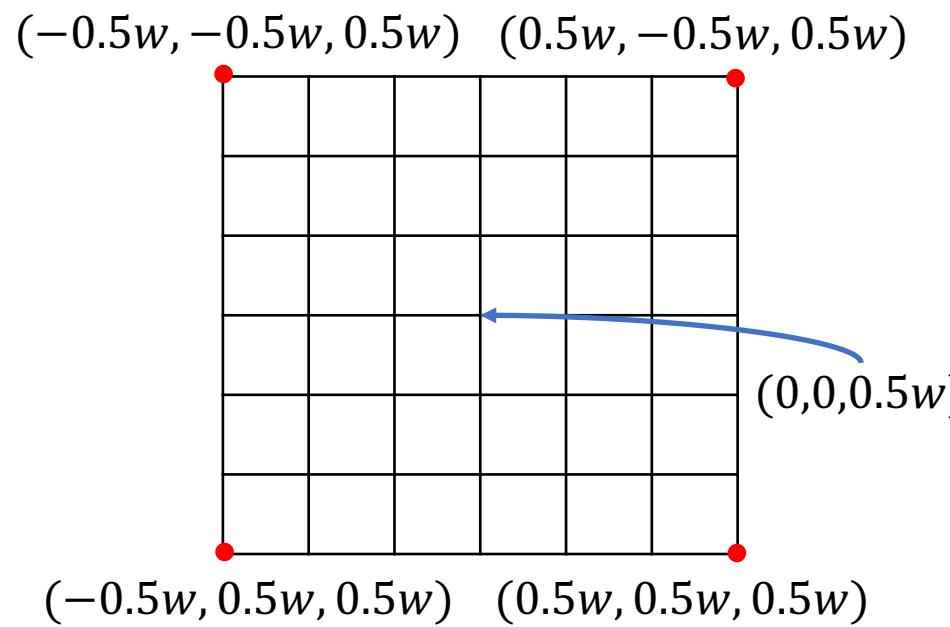
(b)



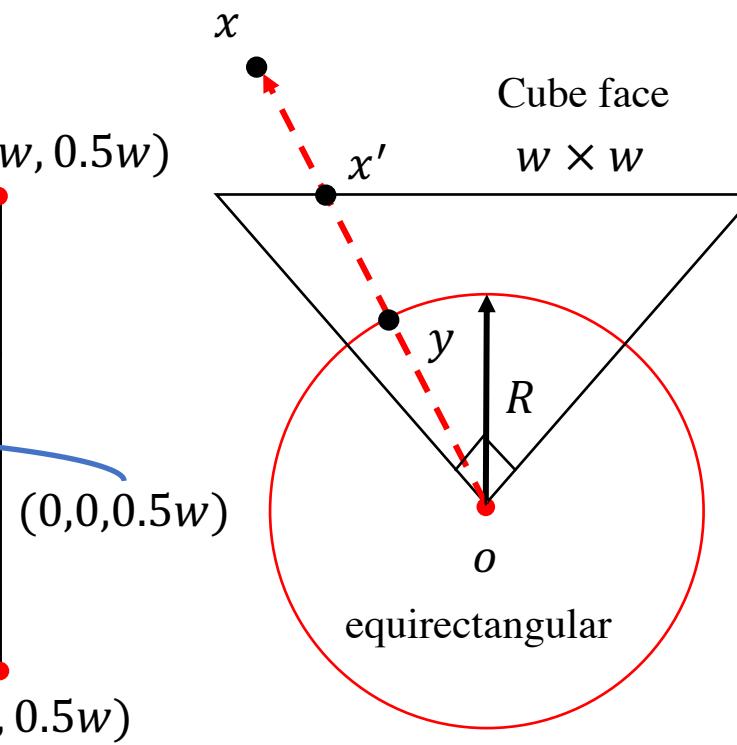
(a)



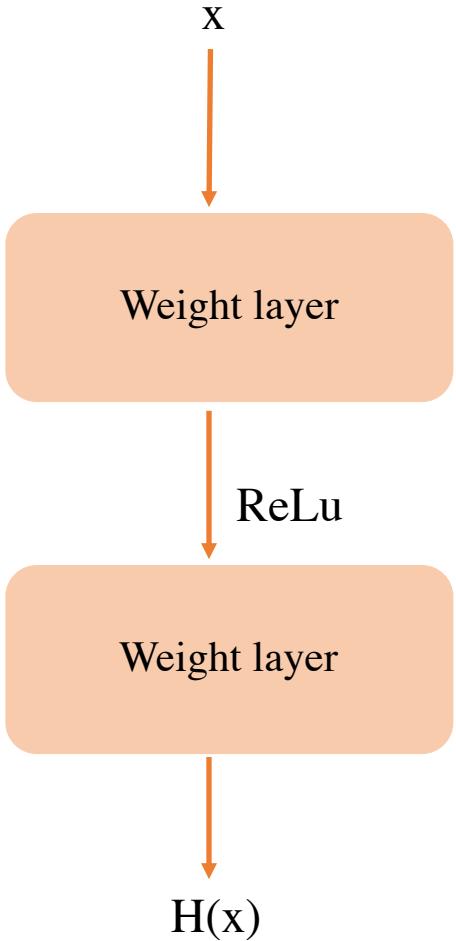
(b)



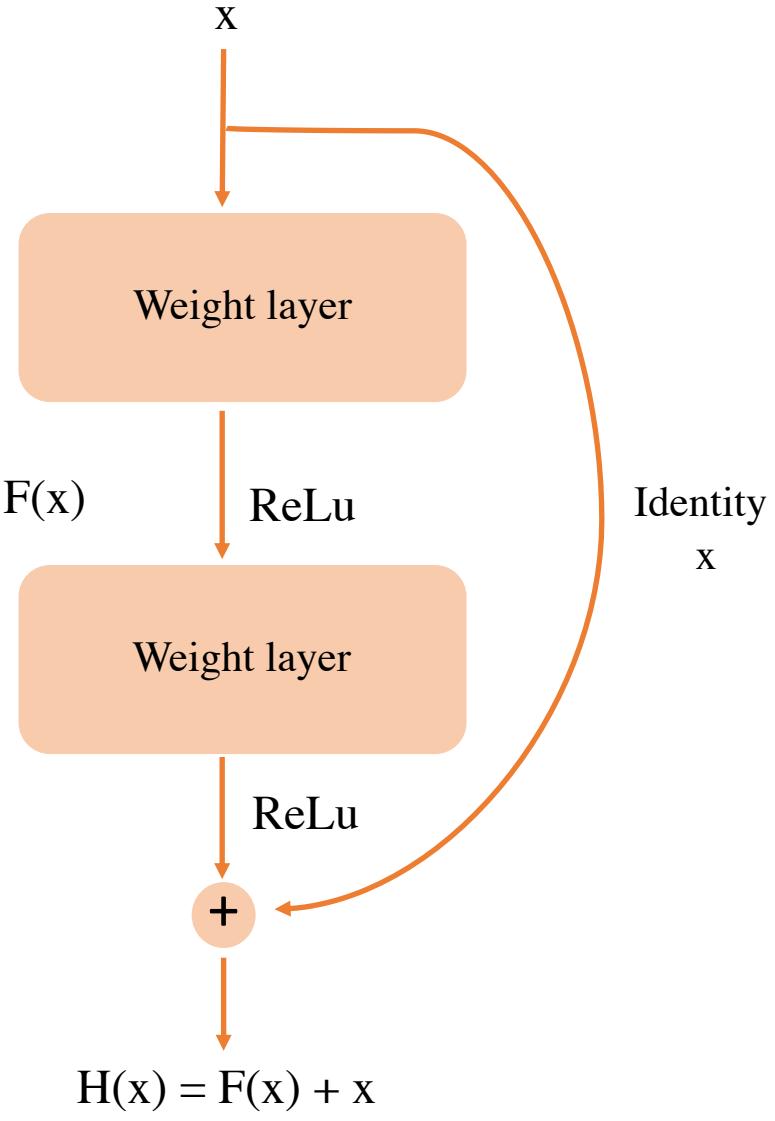
(a)



(b)



(a)



(b)