

(a)

Graph Model Manager**Setters**

```

addNode()/removeNode()
...
addLink()/removeLink()

```

Getters

```

getNodeById()
...
nodes()/links()

```

Calculators

```

Node.neighborNodes()
...
Link.isBridge()

```

Modifier

```

Node.attr()
...
Link.strokeWidth()

```

Data Container**Graph Elements**

```

nodes: [{
  id,
  style,
  attributes,
  position
}, ...],

```

```

links: [{
  source,
  target,
  style,
  attributes
}, ...]

```

Underlying Classes

```

class Element
{
  styles
  attributes
  methods
}

```

```

class Node

```

```

class Link

```

derive

Global Attributes

```

{
  background
  pixel ratio
  DOM container
  ...
}

```

(b)

Rendering Engine

```

class Element Renderer
  WebGL communicator

```

```

Node Renderer
{
  data-shader mapper
  shaders
  id-shaders
}

```

```

Link Renderer
{
  data-shader mapper
  shaders
  id-shaders
}

```

WebGL APIs

```

WebGL Buffer

```

```

GPU Memory

```

(c)

Interaction Manager

```

⏱ mouse listener

```

events

element

```

getElementByPosition()

```