Classification of Layout

1. **Global and incremental layout**

— Layout can be triggered on the entire render tree–this is "global" layout. This can happen as a result of:

- A global style change that affects all renderers, like a font size change.
- As a result of a screen being resized.

— Layout can be incremental, only the dirty renderers will be laid out.Incremental layout is triggered (asynchronously) when renderers are dirty. For example when new renderers are appended to the render tree after extra content came from the network and was added to the DOM tree.

2. **Asynchronous and Synchronous layout**

- Incremental layout is done asynchronously. Firefox queues "reflow commands" for incremental layouts and a scheduler(调度器) triggers batch execution of these commands. WebKit also has a timer that executes an incremental layout–-—the tree is traversed and "dirty" renderers are layout out.
- Scripts asking for style information, like "offsetHeight" can trigger incremental layout synchronously.
- Global layout will usually be triggered synchronously.
- Sometimes layout is triggered as a callback after an initial layout because some attributes, like the scrolling position changed.

Optimizations and The layout process

1. **Optimizations**
   - When a layout is triggered by a "resize" or a change in the renderer position(and not size), the renders sizes are taken from a cache and not recalculated.
   - In some cases only a sub tree is modified and layout does not start from the root. This can happen in cases where the change is local and does not affect its surroundings——like text inserted into text fields.
2. **The layout process**
   1. Parent renderer determines its own width.(dirty bit is true)
   2. Parent goes over children and:
      1. Place the child renderer (sets its x and y).
      2. Calls child layout if needed–they are dirty or we are in a global layout, or for some other reason–which calculates the child's height.
   3. Parent uses children's accumulative(累积的) heights and the heights of margins and padding to set its own height——this will be used by the parent renderer's parent.
   4. Sets its dirty bit to false.