Instructions

Please complete both problems and enter your solutions into the appropriate files. You may use the included unit tests to verify your solution. To submit the completed test, attach the relevant source files to your recruiter. See readme.md for more info on the files of interest.

Problem #1: Visitor Sessions

Your website is getting popular and you would like to get more insights about your traffic. You want to know how many visits, unique visitors and sessions you are serving.

Definitions

- Visits refer to the number of times a site is viewed, no matter how many visitors make up those views.
- Unique visitors refer to the number of distinct individuals requesting pages from the website, regardless of how often they view it.
- Sessions refer to the time a visitor is active on a website. It is defined as a *30 min sliding* window. So for example, if a visitor views your site every 10min for 50min, then all those views are part of the same session (6 views, 1 unique visitor, 1 session). But if a visitor is inactive for more than 30min, and then views your site again a little bit later, that creates a new session for this visitor.

Input

Your will receive an array of *WebsiteVisit* objects. The WebsiteVisits are sorted chronologically (from oldest to most recent).

WebsiteVisit Object Definition

- visitorId: a unique identifier for a visitor.
- timestamp: a timestamp in *seconds*

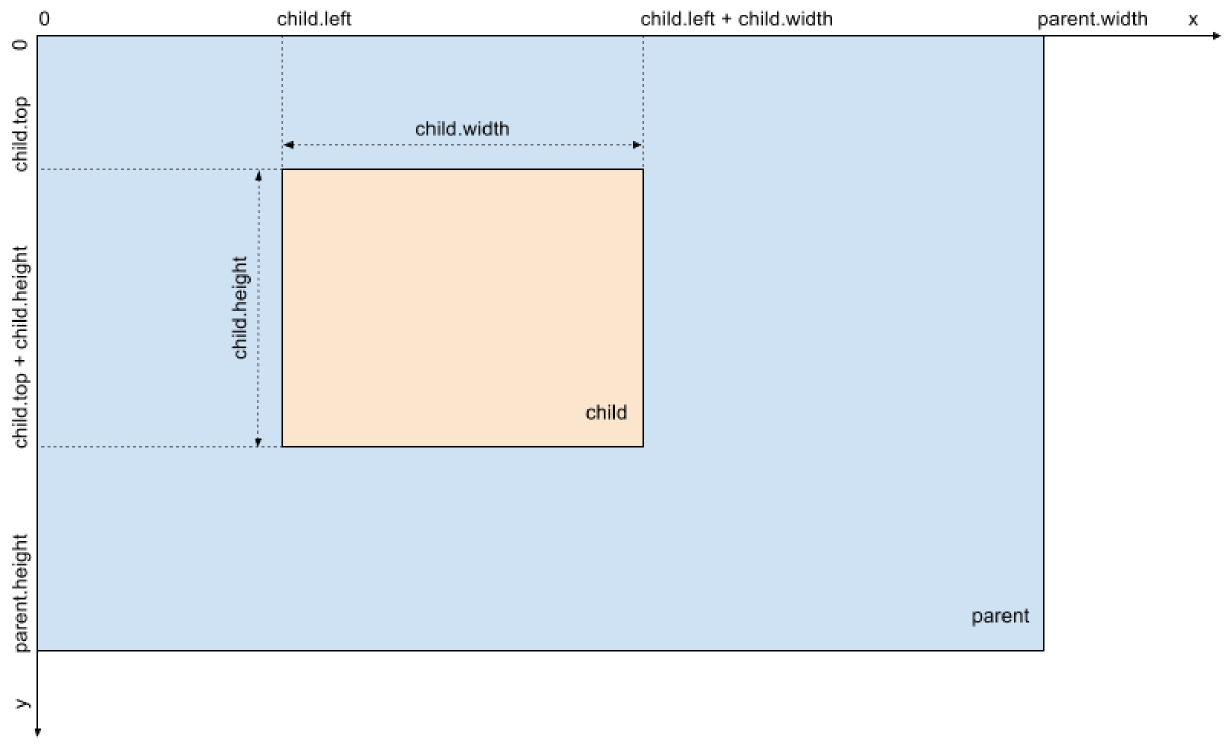
Output

You will return the following values:

- number of website visits
- number of unique visitors
- number of sessions

Problem #2: Template Framework

You are working with a UI template framework that represents a page as a tree of rectangle nodes. Rectangles nest within each other to form a complex rendering of rectangles (like UIViews in iOS). They can nest several levels down.
Just as in iOS, it works in a 2d coordinate system where the upper-left corner has the coordinates (0,0). The **x** axis increases towards the right and the **y** increases towards the bottom.



Input

You will receive a rootNode and a CGPoint.

Node Object Definition

- nodeId: a unique identifier
- frame: the frame of the node, relative to its parent origin. All values (x, y, width, height) will be ≥ 0
- children: an array of nodes, which are the children that are nested within this node

Constraints

- Children are strictly contained in their parent (no overflow). This means that:
    - `0 < child.left + child.width <= parent.width`
    - `0 < child.top + child.height <= parent.height`

- Children nodes may overlap each other. In this case, the child with the higher index covers the child with the lower index.
- Children may not completely fill a parent.

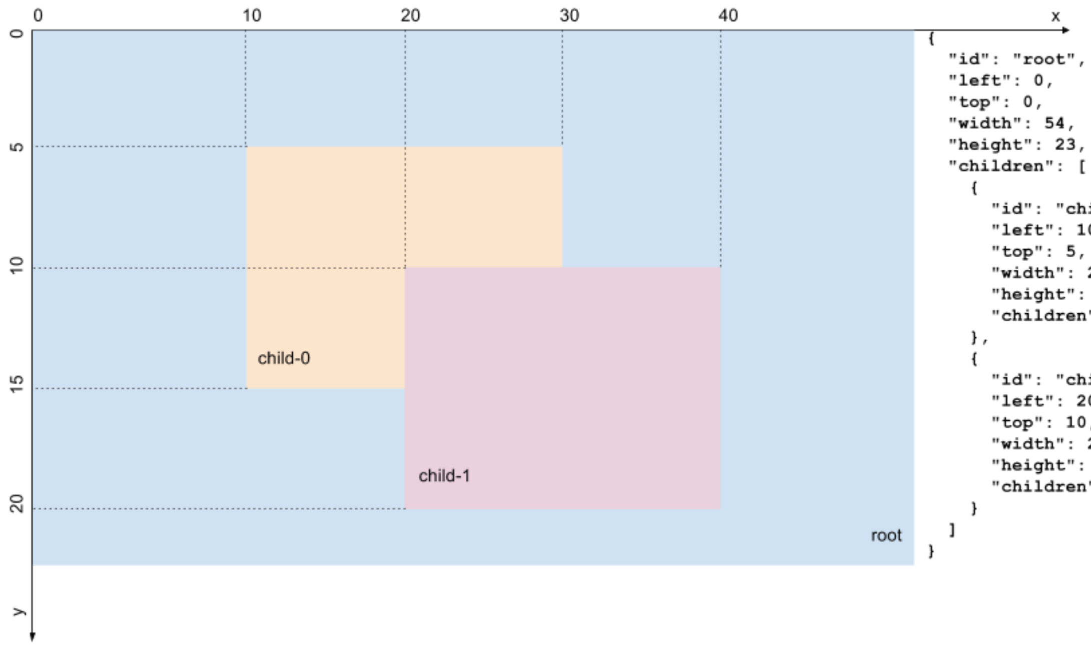
Output

Find the Node that is drawn at the point's coordinates.
Return an array of ids describing the path from the root Node to the Node that you found.
If there is no match, return an empty array.

Reminder

If 2 children overlap, the one with the highest index in the children array is chosen. Also, keep in mind that a child node can have child nodes of their own.

Example



```
{
  "id": "root",
  "left": 0,
  "top": 0,
  "width": 54,
  "height": 23,
  "children": [
    {
      "id": "child-0",
      "left": 10,
      "top": 5,
      "width": 20,
      "height": 10,
      "children": []
    },
    {
      "id": "child-1",
      "left": 20,
      "top": 10,
      "width": 20,
      "height": 10,
      "children": []
    }
  ]
}
```

In the example above, for pixel coordinates (22, 12), the pixel falls into the bounds of "child-0" and "child-1" but "child-1" appears last in the children array. You should thus return the path from "root" to "child-1" -> ["root", "child-1"].