We can't select some of the web elements by any selectors(id, name, class, CSS). Then, XPath comes to our rescue.

To someone in the AP

Absolute Path - /India/AP/Guntur/ Tenali/GanganammaPeta

Relative Path - /Guntur/ Tenali/GanganammaPeta

1. XPath Expressions:

XPath (XML Path Language) is used to navigate through elements and attributes in an XML document. It is commonly used in Selenium to locate elements on a webpage for automation purposes.

2. Types of XPath Expressions:

- **Absolute XPath**:
  - It starts from the root element and traverses the complete path to reach the desired element.
  - Example: `/html/body/div/button`
  - **Usage**: Not recommended for real-time applications because a slight change in the structure of the HTML document will break the XPath.
- **Relative XPath**:
  - It starts from anywhere in the document and locates the element with a more flexible, direct path.
  - Example: `//button[@id='submit']`
  - **Usage**: Preferred for real-time applications as it is more dynamic and less likely to break if the structure of the page changes.

3. Absolute XPath:

- **Definition**: An absolute XPath expression gives the full path starting from the root (`/html`) to the target element.
- **How it works**: It traces the entire hierarchy of HTML elements, starting from the root and going through all nodes.
- **Example**:
  - `/html/body` locates the body of the HTML document.
  - `/html/body/p[1]` locates the first paragraph (`<p>`) in the body.
  - `/html/body/p[@id='para1']` locates the `<p>` tag with the ID "para1."

4. SelectorsHub:

- **Tool for XPath generation**: SelectorsHub is a browser extension that helps in generating, writing, and validating XPath and CSS selectors.

- It makes the process of finding the XPath for any element on a webpage easier by auto-generating the correct path (both absolute and relative).

5. Absolute XPath Examples:

- `/` locates the entire HTML document.
- `/html/head` locates the `<head>` portion of the HTML document.
- `/html/body` locates the `<body>` portion.
- `/html/body/p[1]` locates the first `<p>` (paragraph) tag in the body section.
- `/html/body/p[@id='para1']` locates the `<p>` element with a specific ID.

6. Disadvantages of Absolute XPath:

- **Fragility**: Since Absolute XPath relies on the full path of the element, any minor changes in the structure of the HTML document (such as adding new elements or moving the target element) will break the XPath, requiring it to be recalculated.
- **Maintenance**: Frequent changes in the HTML structure mean that maintaining Absolute XPaths becomes difficult. For example, if a button is moved to another part of the HTML, the Absolute XPath for that button will change, and you'll need to update the test script to reflect the new path.

Summary:

- **Absolute XPath** is not ideal for real-time use because it is rigid and vulnerable to changes in the HTML document structure.
- **Relative XPath** is more robust and should be used for finding elements dynamically on web pages, as it allows for a more flexible search within the document.
- **SelectorsHub** makes it easier to generate and validate XPath expressions without manually writing them.