HTML5

A vocabulary and associated APIs for HTML and XHTML

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8 The HTML syntax

> **Note:** This section only describes the rules for resources labeled with an HTML MIME type. Rules for XML resources are discussed in the section below entitled "The XHTML syntax".

8.1 Writing HTML documents

This section only applies to documents, authoring tools, and markup generators. In particular, it does not apply to conformance checkers; conformance checkers must use the requirements given in the next section ("parsing HTML documents").

Documents must consist of the following parts, in the given order:

1. Optionally, a single "BOM" (U+FEFF) character.
2. Any number of comments and space characters.
3. A DOCTYPE.
4. Any number of comments and space characters.
5. The root element, in the form of an `html` element.
6. Any number of comments and space characters.

The various types of content mentioned above are described in the next few sections.

In addition, there are some restrictions on how character encoding declarations are to be serialized, as discussed in the section on that topic.

> Space characters before the root `html` element, and space characters at the start of the `html` element and before the `head` element, will be dropped when the document is parsed; space characters after the root `html` element will be parsed as if they were at the end of the `body` element. Thus, space characters around the root element do not round-trip.
>
> It is suggested that newlines be inserted after the DOCTYPE, after any comments that are before the root element, after the `html` element's start tag (if it is not omitted), and after any comments that are inside the `html` element but before the `head` element.

Many strings in the HTML syntax (e.g. the names of elements and their attributes) are case-insensitive, but only for uppercase ASCII letters and lowercase ASCII letters. For convenience, in this section this is just referred to as "case-insensitive".

8.1.1 The DOCTYPE

A **DOCTYPE** is a required preamble.

> **Note:** DOCTYPEs are required for legacy reasons. When omitted, browsers tend to use a different rendering mode that is incompatible with some specifications. Including

> the DOCTYPE in a document ensures that the browser makes a best-effort attempt at following the relevant specifications.

A DOCTYPE must consist of the following components, in this order:

1. A string that is an ASCII case-insensitive match for the string "`<!DOCTYPE`".
2. One or more space characters.
3. A string that is an ASCII case-insensitive match for the string "`html`".
4. Optionally, a DOCTYPE legacy string or an obsolete permitted DOCTYPE string (defined below).
5. Zero or more space characters.
6. A ">" (U+003E) character.

> **Note:** In other words, `<!DOCTYPE html>`, case-insensitively.

For the purposes of HTML generators that cannot output HTML markup with the short DOCTYPE "`<!DOCTYPE html>`", a **DOCTYPE legacy string** may be inserted into the DOCTYPE (in the position defined above). This string must consist of:

1. One or more space characters.
2. A string that is an ASCII case-insensitive match for the string "`SYSTEM`".
3. One or more space characters.
4. A U+0022 QUOTATION MARK or U+0027 APOSTROPHE character (the *quote mark*).
5. The literal string "`about:legacy-compat`".
6. A matching U+0022 QUOTATION MARK or U+0027 APOSTROPHE character (i.e. the same character as in the earlier step labeled *quote mark*).

> **Note:** In other words, `<!DOCTYPE html SYSTEM "about:legacy-compat">` or `<!DOCTYPE html SYSTEM 'about:legacy-compat'>`, case-insensitively except for the part in single or double quotes.

The DOCTYPE legacy string should not be used unless the document is generated from a system that cannot output the shorter string.

To help authors transition from HTML4 and XHTML1, an **obsolete permitted DOCTYPE string** can be inserted into the DOCTYPE (in the position defined above). This string must consist of:

1. One or more space characters.
2. A string that is an ASCII case-insensitive match for the string "`PUBLIC`".
3. One or more space characters.
4. A U+0022 QUOTATION MARK or U+0027 APOSTROPHE character (the *first quote mark*).
5. The string from one of the cells in the first column of the table below. The row to which this cell belongs is the *selected row*.
6. A matching U+0022 QUOTATION MARK or U+0027 APOSTROPHE character (i.e. the same character as in the earlier step labeled *first quote mark*).
7. If a system identifier is used,
    1. One or more space characters.
    2. A U+0022 QUOTATION MARK or U+0027 APOSTROPHE character (the *third quote mark*).
    3. The string from the cell in the second column of the *selected row*.
    4. A matching U+0022 QUOTATION MARK or U+0027 APOSTROPHE character (i.e. the same character as in the earlier step labeled *third quote mark*).

Allowed values for public and system identifiers in an obsolete permitted DOCTYPE string.

Public identifier	System identifier	System identifier optional?
-//W3C//DTD HTML 4.0//EN	http://www.w3.org/TR/REC-html40/strict.dtd	Yes
-//W3C//DTD HTML 4.01//EN	http://www.w3.org/TR/html4/strict.dtd	Yes
-//W3C//DTD XHTML 1.0 Strict//EN	http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd	No
-//W3C//DTD XHTML 1.1//EN	http://www.w3.org/TR/xhtml11/DTD/xhtml11.dtd	No

A DOCTYPE containing an obsolete permitted DOCTYPE string is an **obsolete permitted DOCTYPE**. Authors should not use obsolete permitted DOCTYPEs, as they are unnecessarily long.

8.1.2 Elements

There are five different kinds of **elements**: void elements, raw text elements, escapable raw text elements, foreign elements, and normal elements.

Void elements

area, base, br, col, embed, hr, img, input, keygen, link, meta, param, source, track, wbr

Raw text elements

script, style

escapable raw text elements

textarea, title

Foreign elements

Elements from the MathML namespace and the SVG namespace.

Normal elements

All other allowed HTML elements are normal elements.

Tags are used to delimit the start and end of elements in the markup. Raw text, escapable raw text, and normal elements have a start tag to indicate where they begin, and an end tag to indicate where they end. The start and end tags of certain normal elements can be omitted, as described below in the section on optional tags. Those that cannot be omitted must not be omitted. Void elements only have a start tag; end tags must not be specified for void elements. Foreign elements must either have a start tag and an end tag, or a start tag that is marked as self-closing, in which case they must not have an end tag.

The contents of the element must be placed between just after the start tag (which might be implied, in certain cases) and just before the end tag (which again, might be implied in certain cases). The exact allowed contents of each individual element depend on the content model of that element, as described earlier in this specification. Elements must not contain content that their content model disallows. In addition to the restrictions placed on the contents by those content models, however, the five types of elements have additional *syntactic* requirements.

Void elements can't have any contents (since there's no end tag, no content can be put between the start tag and the end tag).

Raw text elements can have text, though it has restrictions described below.

Escapable raw text elements can have text and character references, but the text must not contain an ambiguous ampersand. There are also further restrictions described below.

Foreign elements whose start tag is marked as self-closing can't have any contents (since, again, as there's no end tag, no content can be put between the start tag and the end tag).

Foreign elements whose start tag is *not* marked as self-closing can have text, character references, CDATA sections, other elements, and comments, but the text must not contain the character "<" (U+003C) or an ambiguous ampersand.

> The HTML syntax does not support namespace declarations, even in foreign elements.
>
> For instance, consider the following HTML fragment:
>
> ```
> 
>  <svg>
>   <metadata>
>    <!-- this is invalid -->
>    <cdr:license xmlns:cdr="http://www.example.com/cdr/metadata"
> name="MIT"/>
>   </metadata>
>  </svg>
> 
> ```
>
> The innermost element, `cdr:license`, is actually in the SVG namespace, as the "`xmlns:cdr`" attribute has no effect (unlike in XML). In fact, as the comment in the fragment above says, the fragment is actually non-conforming. This is because the SVG specification does not define any elements called "`cdr:license`" in the SVG namespace.

Normal elements can have text, character references, other elements, and comments, but the text must not contain the character "<" (U+003C) or an ambiguous ampersand. Some normal elements also have yet more restrictions on what content they are allowed to hold, beyond the restrictions imposed by the content model and those described in this paragraph. Those restrictions are described below.

Tags contain a **tag name**, giving the element's name. HTML elements all have names that only use alphanumeric ASCII characters. In the HTML syntax, tag names, even those for foreign elements, may be written with any mix of lower- and uppercase letters that, when converted to all-lowercase, matches the element's tag name; tag names are case-insensitive.

8.1.2.1 Start tags

Start tags must have the following format:

1. The first character of a start tag must be a "<" (U+003C) character.
2. The next few characters of a start tag must be the element's tag name.
3. If there are to be any attributes in the next step, there must first be one or more space characters.
4. Then, the start tag may have a number of attributes, the syntax for which is described below. Attributes must be separated from each other by one or more space characters.
5. After the attributes, or after the tag name if there are no attributes, there may be one or more space characters. (Some attributes are required to be followed by a space. See the attributes section below.)
6. Then, if the element is one of the void elements, or if the element is a foreign element, then there may be a single "/" (U+002F) character. This character has no effect on void elements, but on foreign elements it marks the start tag as self-closing.

7. Finally, start tags must be closed by a ">" (U+003E) character.

8.1.2.2 End tags

End tags must have the following format:

1. The first character of an end tag must be a "<" (U+003C) character.
2. The second character of an end tag must be a "/" (U+002F) character.
3. The next few characters of an end tag must be the element's tag name.
4. After the tag name, there may be one or more space characters.
5. Finally, end tags must be closed by a ">" (U+003E) character.

8.1.2.3 Attributes

Attributes for an element are expressed inside the element's start tag.

Attributes have a name and a value. **Attribute names** must consist of one or more characters other than the space characters, U+0000 NULL, U+0022 QUOTATION MARK ("), U+0027 APOSTROPHE ('), ">" (U+003E), "/" (U+002F), and "=" (U+003D) characters, the control characters, and any characters that are not defined by Unicode. In the HTML syntax, attribute names, even those for foreign elements, may be written with any mix of lower- and uppercase letters that are an ASCII case-insensitive match for the attribute's name.

Attribute values are a mixture of text and character references, except with the additional restriction that the text cannot contain an ambiguous ampersand.

Attributes can be specified in four different ways:

Empty attribute syntax
Just the attribute name. The value is implicitly the empty string.

> **Code Example:**
> In the following example, the `disabled` attribute is given with the empty attribute syntax:
>
> ```
> <input disabled>
> ```

If an attribute using the empty attribute syntax is to be followed by another attribute, then there must be a space character separating the two.

Unquoted attribute value syntax
The attribute name, followed by zero or more space characters, followed by a single U+003D EQUALS SIGN character, followed by zero or more space characters, followed by the attribute value, which, in addition to the requirements given above for attribute values, must not contain any literal space characters, any U+0022 QUOTATION MARK characters ("), U+0027 APOSTROPHE characters ('), "=" (U+003D) characters, "<" (U+003C) characters, ">" (U+003E) characters, or U+0060 GRAVE ACCENT characters (`), and must not be the empty string.

> **Code Example:**
> In the following example, the `value` attribute is given with the unquoted attribute value

> syntax:
>
> ```
> <input value=yes>
> ```

If an attribute using the unquoted attribute syntax is to be followed by another attribute or by the optional "/" (U+002F) character allowed in step 6 of the start tag syntax above, then there must be a space character separating the two.

Single-quoted attribute value syntax

The attribute name, followed by zero or more space characters, followed by a single U+003D EQUALS SIGN character, followed by zero or more space characters, followed by a single "'" (U+0027) character, followed by the attribute value, which, in addition to the requirements given above for attribute values, must not contain any literal "'" (U+0027) characters, and finally followed by a second single "'" (U+0027) character.

> **Code Example:**
> In the following example, the `type` attribute is given with the single-quoted attribute value syntax:
>
> ```
> <input type='checkbox'>
> ```

If an attribute using the single-quoted attribute syntax is to be followed by another attribute, then there must be a space character separating the two.

Double-quoted attribute value syntax

The attribute name, followed by zero or more space characters, followed by a single U+003D EQUALS SIGN character, followed by zero or more space characters, followed by a single """ (U+0022) character, followed by the attribute value, which, in addition to the requirements given above for attribute values, must not contain any literal U+0022 QUOTATION MARK characters ("), and finally followed by a second single """ (U+0022) character.

> **Code Example:**
> In the following example, the `name` attribute is given with the double-quoted attribute value syntax:
>
> ```
> <input name="be evil">
> ```

If an attribute using the double-quoted attribute syntax is to be followed by another attribute, then there must be a space character separating the two.

There must never be two or more attributes on the same start tag whose names are an ASCII case-insensitive match for each other.

When a foreign element has one of the namespaced attributes given by the local name and namespace of the first and second cells of a row from the following table, it must be written using the name given by the third cell from the same row.

Local name	Namespace	Attribute name
actuate	XLink namespace	xlink:actuate
arcrole	XLink namespace	xlink:arcrole
href	XLink namespace	xlink:href
role	XLink namespace	xlink:role
show	XLink namespace	xlink:show

title	XLink namespace	xlink:title
type	XLink namespace	xlink:type
base	XML namespace	xml:base
lang	XML namespace	xml:lang
space	XML namespace	xml:space
xmlns	XMLNS namespace	xmlns
xlink	XMLNS namespace	xmlns:xlink

No other namespaced attribute can be expressed in the HTML syntax.

> **Note:** Whether the attributes in the table above are conforming or not is defined by other specifications (e.g. the SVG and MathML specifications); this section only describes the syntax rules if the attributes are serialized using the HTML syntax.

8.1.2.4 Optional tags

Certain tags can be **omitted**.

> **Note:** Omitting an element's start tag in the situations described below does not mean the element is not present; it is implied, but it is still there. For example, an HTML document always has a root `html` element, even if the string `<html>` doesn't appear anywhere in the markup.

An `html` element's start tag may be omitted if the first thing inside the `html` element is not a comment.

An `html` element's end tag may be omitted if the `html` element is not immediately followed by a comment.

A `head` element's start tag may be omitted if the element is empty, or if the first thing inside the `head` element is an element.

A `head` element's end tag may be omitted if the `head` element is not immediately followed by a space character or a comment.

A `body` element's start tag may be omitted if the element is empty, or if the first thing inside the `body` element is not a space character or a comment, except if the first thing inside the `body` element is a `meta`, `link`, `script`, `style`, or `template` element.

A `body` element's end tag may be omitted if the `body` element is not immediately followed by a comment.

An `li` element's end tag may be omitted if the `li` element is immediately followed by another `li` element or if there is no more content in the parent element.

A `dt` element's end tag may be omitted if the `dt` element is immediately followed by another `dt` element or a `dd` element.

A `dd` element's end tag may be omitted if the `dd` element is immediately followed by another `dd` element or a `dt` element, or if there is no more content in the parent element.

A p element's end tag may be omitted if the p element is immediately followed by an address, article, aside, blockquote, div, dl, fieldset, footer, form, h1, h2, h3, h4, h5, h6, header, hgroup, hr, main, nav, ol, p, pre, section, table, or ul, element, or if there is no more content in the parent element and the parent element is not an a element.

An rb element's end tag may be omitted if the rb element is immediately followed by an rb, rt, rtc or rp element, or if there is no more content in the parent element.

An rt element's end tag may be omitted if the rt element is immediately followed by an rb, rt or rp element, or if there is no more content in the parent element.

An rtc element's end tag may be omitted if the rtc element is immediately followed by an rb, rt, rtc or rp element, or if there is no more content in the parent element.

An rp element's end tag may be omitted if the rp element is immediately followed by an rb, rt, rtc or rp element, or if there is no more content in the parent element.

An optgroup element's end tag may be omitted if the optgroup element is immediately followed by another optgroup element, or if there is no more content in the parent element.

An option element's end tag may be omitted if the option element is immediately followed by another option element, or if it is immediately followed by an optgroup element, or if there is no more content in the parent element.

A colgroup element's start tag may be omitted if the first thing inside the colgroup element is a col element, and if the element is not immediately preceded by another colgroup element whose end tag has been omitted. (It can't be omitted if the element is empty.)

A colgroup element's end tag may be omitted if the colgroup element is not immediately followed by a space character or a comment.

A thead element's end tag may be omitted if the thead element is immediately followed by a tbody or tfoot element.

A tbody element's start tag may be omitted if the first thing inside the tbody element is a tr element, and if the element is not immediately preceded by a tbody, thead, or tfoot element whose end tag has been omitted. (It can't be omitted if the element is empty.)

A tbody element's end tag may be omitted if the tbody element is immediately followed by a tbody or tfoot element, or if there is no more content in the parent element.

A tfoot element's end tag may be omitted if the tfoot element is immediately followed by a tbody element, or if there is no more content in the parent element.

A tr element's end tag may be omitted if the tr element is immediately followed by another tr element, or if there is no more content in the parent element.

A td element's end tag may be omitted if the td element is immediately followed by a td or th element, or if there is no more content in the parent element.

A th element's end tag may be omitted if the th element is immediately followed by a td or th element, or if there is no more content in the parent element.

However, a start tag must never be omitted if it has any attributes.

8.1.2.5 Restrictions on content models

For historical reasons, certain elements have extra restrictions beyond even the restrictions given by their content model.

A `table` element must not contain `tr` elements, even though these elements are technically allowed inside `table` elements according to the content models described in this specification. (If a `tr` element is put inside a `table` in the markup, it will in fact imply a `tbody` start tag before it.)

A single newline may be placed immediately after the start tag of `pre` and `textarea` elements. If the element's contents are intended to start with a newline, two consecutive newlines thus need to be included by the author.

> **Code Example:**
>
> The following two `pre` blocks are equivalent:
>
> ```
> <pre>Hello</pre>
>
> <pre>
> Hello</pre>
> ```

8.1.2.6 Restrictions on the contents of raw text and escapable raw text elements

The text in raw text and escapable raw text elements must not contain any occurrences of the string "</" (U+003C LESS-THAN SIGN, U+002F SOLIDUS) followed by characters that case-insensitively match the tag name of the element followed by one of "tab" (U+0009), "LF" (U+000A), "FF" (U+000C), "CR" (U+000D), U+0020 SPACE, ">" (U+003E), or "/" (U+002F).

8.1.3 Text

Text is allowed inside elements, attribute values, and comments. Extra constraints are placed on what is and what is not allowed in text based on where the text is to be put, as described in the other sections.

8.1.3.1 Newlines

Newlines in HTML may be represented either as "CR" (U+000D) characters, "LF" (U+000A) characters, or pairs of "CR" (U+000D), "LF" (U+000A) characters in that order.

Where character references are allowed, a character reference of a "LF" (U+000A) character (but not a "CR" (U+000D) character) also represents a newline.

8.1.4 Character references

In certain cases described in other sections, text may be mixed with **character references**. These can be used to escape characters that couldn't otherwise legally be included in text.

Character references must start with a U+0026 AMPERSAND character (&). Following this, there are three possible kinds of character references:

Named character references
: The ampersand must be followed by one of the names given in the named character references section, using the same case. The name must be one that is terminated by a ";"

(U+003B) character.

Decimal numeric character reference

The ampersand must be followed by a "#" (U+0023) character, followed by one or more ASCII digits, representing a base-ten integer that corresponds to a Unicode code point that is allowed according to the definition below. The digits must then be followed by a ";" (U+003B) character.

Hexadecimal numeric character reference

The ampersand must be followed by a "#" (U+0023) character, which must be followed by either a "x" (U+0078) character or a "X" (U+0058) character, which must then be followed by one or more ASCII hex digits, representing a base-sixteen integer that corresponds to a Unicode code point that is allowed according to the definition below. The digits must then be followed by a ";" (U+003B) character.

The numeric character reference forms described above are allowed to reference any Unicode code point other than U+0000, U+000D, permanently undefined Unicode characters (noncharacters), surrogates (U+D800–U+DFFF), and control characters other than space characters.

An **ambiguous ampersand** is a U+0026 AMPERSAND character (&) that is followed by one or more alphanumeric ASCII characters, followed by a ";" (U+003B) character, where these characters do not match any of the names given in the named character references section.

8.1.5 CDATA sections

CDATA sections must consist of the following components, in this order:

1. The string "`<![CDATA[`".
2. Optionally, text, with the additional restriction that the text must not contain the string "`]]>`".
3. The string "`]]>`".

> **Code Example:**
>
> CDATA sections can only be used in foreign content (MathML or SVG). In this example, a CDATA section is used to escape the contents of an `ms` element:
>
> ```
> You can add a string to a number, but this stringifies the number:
> <math>
>  <ms><![CDATA[x<y]]></ms>
>  <mo>+</mo>
>  <mn>3</mn>
>  <mo>=</mo>
>  <ms><![CDATA[x<y3]]></ms>
> </math>
> ```

8.1.6 Comments

Comments must start with the four character sequence U+003C LESS-THAN SIGN, U+0021 EXCLAMATION MARK, U+002D HYPHEN-MINUS, U+002D HYPHEN-MINUS (`<!--`). Following this sequence, the comment may have text, with the additional restriction that the text must not start with a single ">" (U+003E) character, nor start with a U+002D HYPHEN-MINUS character (-) followed by a ">" (U+003E) character, nor contain two consecutive U+002D HYPHEN-MINUS characters (`--`), nor end with a U+002D HYPHEN-MINUS character (-). Finally, the comment must be ended by the three character sequence U+002D HYPHEN-

MINUS, U+002D HYPHEN-MINUS, U+003E GREATER-THAN SIGN (-->).

8.2 Parsing HTML documents

This section only applies to user agents, data mining tools, and conformance checkers.

> **Note:** The rules for parsing XML documents into DOM trees are covered by the next section, entitled "The XHTML syntax".

User agents must use the parsing rules described in this section to generate the DOM trees from `text/html` resources. Together, these rules define what is referred to as the **HTML parser**.

> While the HTML syntax described in this specification bears a close resemblance to SGML and XML, it is a separate language with its own parsing rules.
>
> Some earlier versions of HTML (in particular from HTML2 to HTML4) were based on SGML and used SGML parsing rules. However, few (if any) web browsers ever implemented true SGML parsing for HTML documents; the only user agents to strictly handle HTML as an SGML application have historically been validators. The resulting confusion — with validators claiming documents to have one representation while widely deployed Web browsers interoperably implemented a different representation — has wasted decades of productivity. This version of HTML thus returns to a non-SGML basis.
>
> Authors interested in using SGML tools in their authoring pipeline are encouraged to use XML tools and the XML serialization of HTML.

This specification defines the parsing rules for HTML documents, whether they are syntactically correct or not. Certain points in the parsing algorithm are said to be **parse errors**. The error handling for parse errors is well-defined (that's the processing rules described throughout this specification), but user agents, while parsing an HTML document, may abort the parser at the first parse error that they encounter for which they do not wish to apply the rules described in this specification.

Conformance checkers must report at least one parse error condition to the user if one or more parse error conditions exist in the document and must not report parse error conditions if none exist in the document. Conformance checkers may report more than one parse error condition if more than one parse error condition exists in the document.

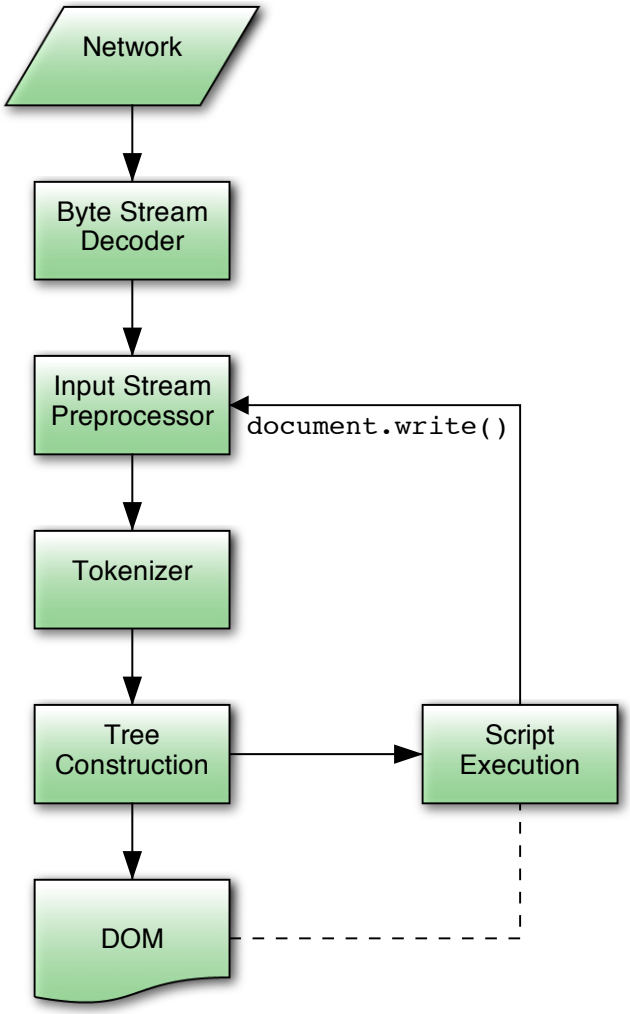
> **Note:** Parse errors are only errors with the syntax of HTML. In addition to checking for parse errors, conformance checkers will also verify that the document obeys all the other conformance requirements described in this specification.

For the purposes of conformance checkers, if a resource is determined to be in the HTML syntax, then it is an HTML document.

> **Note:** As stated in the terminology section, references to element types that do not explicitly specify a namespace always refer to elements in the HTML namespace. For example, if the spec talks about "a `div` element", then that is an element with the local name "`div`", the namespace "`http://www.w3.org/1999/xhtml`", and the interface `HTMLDivElement`. Where possible, references to such elements are hyperlinked to their definition.

8.2.1 Overview of the parsing model

The input to the HTML parsing process consists of a stream of Unicode code points, which is passed through a tokenization stage followed by a tree construction stage. The output is a `Document` object.



> **Note:** Implementations that do not support scripting do not have to actually create a DOM `Document` object, but the DOM tree in such cases is still used as the model for the rest of the specification.

In the common case, the data handled by the tokenization stage comes from the network, but it can also come from script running in the user agent, e.g. using the `document.write()` API.

There is only one set of states for the tokenizer stage and the tree construction stage, but the tree construction stage is reentrant, meaning that while the tree construction stage is handling one token, the tokenizer might be resumed, causing further tokens to be emitted and processed before the first token's processing is complete.

> **Code Example:**
>
> In the following example, the tree construction stage will be called upon to handle a "p" start tag token while handling the "script" end tag token:
>
> ```
> ...
> <script>
>  document.write('<p>');
> </script>
> ...
> ```

To handle these cases, parsers have a **script nesting level**, which must be initially set to zero, and a **parser pause flag**, which must be initially set to false.

8.2.2 The input byte stream

The stream of Unicode code points that comprises the input to the tokenization stage will be initially seen by the user agent as a stream of bytes (typically coming over the network or from the local file system). The bytes encode the actual characters according to a particular *character encoding*, which the user agent uses to decode the bytes into characters.

> **Note:** For XML documents, the algorithm user agents must use to determine the

> character encoding is given by the XML specification. This section does not apply to XML documents. [XML]

Usually, the encoding sniffing algorithm defined below is used to determine the character encoding.

Given a character encoding, the bytes in the input byte stream must be converted to Unicode code points for the tokenizer's input stream, as described by the rules for that encoding's decoder.

> **Note:** Bytes or sequences of bytes in the original byte stream that did not conform to the encoding specification (e.g. invalid UTF-8 byte sequences in a UTF-8 input byte stream) are errors that conformance checkers are expected to report.

> **Note:** Leading Byte Order Marks (BOMs) are not stripped by the decoder algorithms, they are stripped by the algorithm below.

> ⚠**Warning!** The decoder algorithms describe how to handle invalid input; for security reasons, it is imperative that those rules be followed precisely. Differences in how invalid byte sequences are handled can result in, amongst other problems, script injection vulnerabilities ("XSS").

When the HTML parser is decoding an input byte stream, it uses a character encoding and a **confidence**. The confidence is either *tentative*, *certain*, or *irrelevant*. The encoding used, and whether the confidence in that encoding is *tentative* or *certain*, is used during the parsing to determine whether to change the encoding. If no encoding is necessary, e.g. because the parser is operating on a Unicode stream and doesn't have to use a character encoding at all, then the confidence is *irrelevant*.

> **Note:** Some algorithms feed the parser by directly adding characters to the input stream rather than adding bytes to the input byte stream.

8.2.2.1 Parsing with a known character encoding

When the HTML parser is to operate on an input byte stream that has **a known definite encoding**, then the character encoding is that encoding and the confidence is *certain*.

8.2.2.2 Determining the character encoding

In some cases, it might be impractical to unambiguously determine the encoding before parsing the document. Because of this, this specification provides for a two-pass mechanism with an optional pre-scan. Implementations are allowed, as described below, to apply a simplified parsing algorithm to whatever bytes they have available before beginning to parse the document. Then, the real parser is started, using a tentative encoding derived from this pre-parse and other out-of-band metadata. If, while the document is being loaded, the user agent discovers a character encoding declaration that conflicts with this information, then the parser can get reinvoked to perform a parse of the document with the real encoding.

User agents must use the following algorithm, called the **encoding sniffing algorithm**, to

determine the character encoding to use when decoding a document in the first pass. This algorithm takes as input any out-of-band metadata available to the user agent (e.g. the Content-Type metadata of the document) and all the bytes available so far, and returns a character encoding and a confidence that is either *tentative* or *certain*.

1. If the user has explicitly instructed the user agent to override the document's character encoding with a specific encoding, optionally return that encoding with the confidence *certain* and abort these steps.

   > **Note:** Typically, user agents remember such user requests across sessions, and in some cases apply them to documents in `iframe`s as well.

2. The user agent may wait for more bytes of the resource to be available, either in this step or at any later step in this algorithm. For instance, a user agent might wait 500ms or 1024 bytes, whichever came first. In general preparsing the source to find the encoding improves performance, as it reduces the need to throw away the data structures used when parsing upon finding the encoding information. However, if the user agent delays too long to obtain data to determine the encoding, then the cost of the delay could outweigh any performance improvements from the preparse.

   > **Note:** The authoring conformance requirements for character encoding declarations limit them to only appearing in the first 1024 bytes. User agents are therefore encouraged to use the prescan algorithm below (as invoked by these steps) on the first 1024 bytes, but not to stall beyond that.

3. For each of the rows in the following table, starting with the first one and going down, if there are as many or more bytes available than the number of bytes in the first column, and the first bytes of the file match the bytes given in the first column, then return the encoding given in the cell in the second column of that row, with the confidence *certain*, and abort these steps:

Bytes in Hexadecimal	Encoding
FE FF	Big-endian UTF-16
FF FE	Little-endian UTF-16
EF BB BF	UTF-8

   > **Note:** This step looks for Unicode Byte Order Marks (BOMs).

   > **Note:** That this step happens before the next one honoring the HTTP `Content-Type` header is a willful violation of the HTTP specification, motivated by a desire to be maximally compatible with legacy content. [HTTP]

4. If the transport layer specifies a character encoding, and it is supported, return that encoding with the confidence *certain*, and abort these steps.

5. Optionally prescan the byte stream to determine its encoding. The *end condition* is that the user agent decides that scanning further bytes would not be efficient. User agents are encouraged to only prescan the first 1024 bytes. User agents may decide that scanning *any* bytes is not efficient, in which case these substeps are entirely skipped.

   The aforementioned algorithm either aborts unsuccessfully or returns a character

encoding. If it returns a character encoding, then this algorithm must be aborted, returning the same encoding, with confidence *tentative*.

6. If the HTML parser for which this algorithm is being run is associated with a `Document` that is itself in a nested browsing context, run these substeps:

    1. Let *new document* be the `Document` with which the HTML parser is associated.

    2. Let *parent document* be the `Document` through which *new document* is nested (the active document of the parent browsing context of *new document*).

    3. If *parent document*'s origin is not the same origin as *new document*'s origin, then abort these substeps.

    4. If *parent document*'s character encoding is not an ASCII-compatible character encoding, then abort these substeps.

    5. Return *parent document*'s character encoding, with the confidence *tentative*, and abort the encoding sniffing algorithm's steps.

7. Otherwise, if the user agent has information on the likely encoding for this page, e.g. based on the encoding of the page when it was last visited, then return that encoding, with the confidence *tentative*, and abort these steps.

8. The user agent may attempt to autodetect the character encoding from applying frequency analysis or other algorithms to the data stream. Such algorithms may use information about the resource other than the resource's contents, including the address of the resource. If autodetection succeeds in determining a character encoding, and that encoding is a supported encoding, then return that encoding, with the confidence *tentative*, and abort these steps. [UNIVCHARDET]

    > **Note:** The UTF-8 encoding has a highly detectable bit pattern. Documents that contain bytes with values greater than 0x7F which match the UTF-8 pattern are very likely to be UTF-8, while documents with byte sequences that do not match it are very likely not. User-agents are therefore encouraged to search for this common encoding. [PPUTF8] [UTF8DET]

9. Otherwise, return an implementation-defined or user-specified default character encoding, with the confidence *tentative*.

    In controlled environments or in environments where the encoding of documents can be prescribed (for example, for user agents intended for dedicated use in new networks), the comprehensive `UTF-8` encoding is suggested.

    In other environments, the default encoding is typically dependent on the user's locale (an approximation of the languages, and thus often encodings, of the pages that the user is likely to frequent). The following table gives suggested defaults based on the user's locale, for compatibility with legacy content. Locales are identified by BCP 47 language tags. [BCP47] [ENCODING]

Locale language		Suggested default encoding
ar	Arabic	windows-1256
ba	Bashkir	windows-1251
be	Belarusian	windows-1251
bg	Bulgarian	windows-1251

cs	Czech	windows-1250
el	Greek	ISO-8859-7
et	Estonian	windows-1257
fa	Persian	windows-1256
he	Hebrew	windows-1255
hr	Croatian	windows-1250
hu	Hungarian	ISO-8859-2
ja	Japanese	Shift_JIS
kk	Kazakh	windows-1251
ko	Korean	euc-kr
ku	Kurdish	windows-1254
ky	Kyrgyz	windows-1251
lt	Lithuanian	windows-1257
lv	Latvian	windows-1257
mk	Macedonian	windows-1251
pl	Polish	ISO-8859-2
ru	Russian	windows-1251
sah	Yakut	windows-1251
sk	Slovak	windows-1250
sl	Slovenian	ISO-8859-2
sr	Serbian	windows-1251
tg	Tajik	windows-1251
th	Thai	windows-874
tr	Turkish	windows-1254
tt	Tatar	windows-1251
uk	Ukrainian	windows-1251
vi	Vietnamese	windows-1258
zh-CN	Chinese (People's Republic of China)	GB18030
zh-TW	Chinese (Taiwan)	Big5
All other locales		windows-1252

The contents of this table are derived from the intersection of Windows, Chrome, and Firefox defaults.

The document's character encoding must immediately be set to the value returned from this algorithm, at the same time as the user agent uses the returned value to select the decoder to use for the input byte stream.

When an algorithm requires a user agent to **prescan a byte stream to determine its encoding**, given some defined *end condition*, then it must run the following steps. These steps either abort unsuccessfully or return a character encoding. If at any point during these steps (including during instances of the get an attribute algorithm invoked by this one) the user agent either runs out of bytes (meaning the *position* pointer created in the first step below goes beyond the end of the

byte stream obtained so far) or reaches its *end condition*, then abort the prescan a byte stream to determine its encoding algorithm unsuccessfully.

1. Let *position* be a pointer to a byte in the input byte stream, initially pointing at the first byte.
2. *Loop*: If *position* points to:

   ↪ **A sequence of bytes starting with: 0x3C 0x21 0x2D 0x2D (ASCII '<!--')**
   Advance the *position* pointer so that it points at the first 0x3E byte which is preceded by two 0x2D bytes (i.e. at the end of an ASCII '-->' sequence) and comes after the 0x3C byte that was found. (The two 0x2D bytes can be the same as the those in the '<!--' sequence.)

   ↪ **A sequence of bytes starting with: 0x3C, 0x4D or 0x6D, 0x45 or 0x65, 0x54 or 0x74, 0x41 or 0x61, and one of 0x09, 0x0A, 0x0C, 0x0D, 0x20, 0x2F (case-insensitive ASCII '<meta' followed by a space or slash)**

   1. Advance the *position* pointer so that it points at the next 0x09, 0x0A, 0x0C, 0x0D, 0x20, or 0x2F byte (the one in sequence of characters matched above).
   2. Let *attribute list* be an empty list of strings.
   3. Let *got pragma* be false.
   4. Let *need pragma* be null.
   5. Let *charset* be the null value (which, for the purposes of this algorithm, is distinct from an unrecognised encoding or the empty string).
   6. *Attributes*: Get an attribute and its value. If no attribute was sniffed, then jump to the *processing* step below.
   7. If the attribute's name is already in *attribute list*, then return to the step labeled *attributes*.
   8. Add the attribute's name to *attribute list*.
   9. Run the appropriate step from the following list, if one applies:

      ↪ **If the attribute's name is "`http-equiv`"**
      If the attribute's value is "`content-type`", then set *got pragma* to true.

      ↪ **If the attribute's name is "`content`"**
      Apply the algorithm for extracting a character encoding from a `meta` element, giving the attribute's value as the string to parse. If a character encoding is returned, and if *charset* is still set to null, let *charset* be the encoding returned, and set *need pragma* to true.

      ↪ **If the attribute's name is "`charset`"**
      Let *charset* be the result of getting an encoding from the attribute's value, and set *need pragma* to false.

   10. Return to the step labeled *attributes*.
   11. *Processing*: If *need pragma* is null, then jump to the step below labeled

next byte.

12. If *need pragma* is true but *got pragma* is false, then jump to the step below labeled *next byte*.

13. If *charset* is a UTF-16 encoding, change the value of *charset* to UTF-8.

14. If *charset* is not a supported character encoding, then jump to the step below labeled *next byte*.

15. Abort the prescan a byte stream to determine its encoding algorithm, returning the encoding given by *charset*.

↪ **A sequence of bytes starting with a 0x3C byte (ASCII <), optionally a 0x2F byte (ASCII /), and finally a byte in the range 0x41-0x5A or 0x61-0x7A (an ASCII letter)**

1. Advance the *position* pointer so that it points at the next 0x09 (ASCII TAB), 0x0A (ASCII LF), 0x0C (ASCII FF), 0x0D (ASCII CR), 0x20 (ASCII space), or 0x3E (ASCII >) byte.

2. Repeatedly get an attribute until no further attributes can be found, then jump to the step below labeled *next byte*.

↪ **A sequence of bytes starting with: 0x3C 0x21 (ASCII '<!')**
↪ **A sequence of bytes starting with: 0x3C 0x2F (ASCII '</')**
↪ **A sequence of bytes starting with: 0x3C 0x3F (ASCII '<?')**
Advance the *position* pointer so that it points at the first 0x3E byte (ASCII >) that comes after the 0x3C byte that was found.

↪ **Any other byte**
Do nothing with that byte.

3. *Next byte*: Move *position* so it points at the next byte in the input byte stream, and return to the step above labeled *loop*.

When the prescan a byte stream to determine its encoding algorithm says to **get an attribute**, it means doing this:

1. If the byte at *position* is one of 0x09 (ASCII TAB), 0x0A (ASCII LF), 0x0C (ASCII FF), 0x0D (ASCII CR), 0x20 (ASCII space), or 0x2F (ASCII /) then advance *position* to the next byte and redo this step.

2. If the byte at *position* is 0x3E (ASCII >), then abort the get an attribute algorithm. There isn't one.

3. Otherwise, the byte at *position* is the start of the attribute name. Let *attribute name* and *attribute value* be the empty string.

4. Process the byte at *position* as follows:

↪ **If it is 0x3D (ASCII =), and the *attribute name* is longer than the empty string**
Advance *position* to the next byte and jump to the step below labeled *value*.
↪ **If it is 0x09 (ASCII TAB), 0x0A (ASCII LF), 0x0C (ASCII FF), 0x0D (ASCII CR), or 0x20 (ASCII space)**
Jump to the step below labeled *spaces*.
↪ **If it is 0x2F (ASCII /) or 0x3E (ASCII >)**
Abort the get an attribute algorithm. The attribute's name is the value of *attribute name*, its value is the empty string.

- **If it is in the range 0x41 (ASCII A) to 0x5A (ASCII Z)**
  Append the Unicode character with code point *b*+0x20 to *attribute name* (where *b* is the value of the byte at *position*). (This converts the input to lowercase.)
- **Anything else**
  Append the Unicode character with the same code point as the value of the byte at *position* to *attribute name*. (It doesn't actually matter how bytes outside the ASCII range are handled here, since only ASCII characters can contribute to the detection of a character encoding.)

5. Advance *position* to the next byte and return to the previous step.
6. *Spaces*: If the byte at *position* is one of 0x09 (ASCII TAB), 0x0A (ASCII LF), 0x0C (ASCII FF), 0x0D (ASCII CR), or 0x20 (ASCII space) then advance *position* to the next byte, then, repeat this step.
7. If the byte at *position* is *not* 0x3D (ASCII =), abort the get an attribute algorithm. The attribute's name is the value of *attribute name*, its value is the empty string.
8. Advance *position* past the 0x3D (ASCII =) byte.
9. *Value*: If the byte at *position* is one of 0x09 (ASCII TAB), 0x0A (ASCII LF), 0x0C (ASCII FF), 0x0D (ASCII CR), or 0x20 (ASCII space) then advance *position* to the next byte, then, repeat this step.
10. Process the byte at *position* as follows:

- **If it is 0x22 (ASCII ") or 0x27 (ASCII ')**

  1. Let *b* be the value of the byte at *position*.
  2. *Quote loop*: Advance *position* to the next byte.
  3. If the value of the byte at *position* is the value of *b*, then advance *position* to the next byte and abort the "get an attribute" algorithm. The attribute's name is the value of *attribute name*, and its value is the value of *attribute value*.
  4. Otherwise, if the value of the byte at *position* is in the range 0x41 (ASCII A) to 0x5A (ASCII Z), then append a Unicode character to *attribute value* whose code point is 0x20 more than the value of the byte at *position*.
  5. Otherwise, append a Unicode character to *attribute value* whose code point is the same as the value of the byte at *position*.
  6. Return to the step above labeled *quote loop*.

- **If it is 0x3E (ASCII >)**
  Abort the get an attribute algorithm. The attribute's name is the value of *attribute name*, its value is the empty string.
- **If it is in the range 0x41 (ASCII A) to 0x5A (ASCII Z)**
  Append the Unicode character with code point *b*+0x20 to *attribute value* (where *b* is the value of the byte at *position*). Advance *position* to the next byte.
- **Anything else**
  Append the Unicode character with the same code point as the value of the byte at *position* to *attribute value*. Advance *position* to the next byte.

11. Process the byte at *position* as follows:

    ↪ **If it is 0x09 (ASCII TAB), 0x0A (ASCII LF), 0x0C (ASCII FF), 0x0D (ASCII CR), 0x20 (ASCII space), or 0x3E (ASCII >)**
    Abort the get an attribute algorithm. The attribute's name is the value of *attribute name* and its value is the value of *attribute value*.

    ↪ **If it is in the range 0x41 (ASCII A) to 0x5A (ASCII Z)**
    Append the Unicode character with code point *b*+0x20 to *attribute value* (where *b* is the value of the byte at *position*).

    ↪ **Anything else**
    Append the Unicode character with the same code point as the value of the byte at *position* to *attribute value*.

12. Advance *position* to the next byte and return to the previous step.

For the sake of interoperability, user agents should not use a pre-scan algorithm that returns different results than the one described above. (But, if you do, please at least let us know, so that we can improve this algorithm and benefit everyone...)

8.2.2.3 Character encodings

User agents must support the encodings defined in the Encoding standard. User agents should not support other encodings.

User agents must not support the CESU-8, UTF-7, BOCU-1 and SCSU encodings. [CESU8] [UTF7] [BOCU1] [SCSU]

Support for encodings based on EBCDIC is especially discouraged. This encoding is rarely used for publicly-facing Web content. Support for UTF-32 is also especially discouraged. This encoding is rarely used, and frequently implemented incorrectly.

> **Note:** This specification does not make any attempt to support EBCDIC-based encodings and UTF-32 in its algorithms; support and use of these encodings can thus lead to unexpected behavior in implementations of this specification.

8.2.2.4 Changing the encoding while parsing

When the parser requires the user agent to **change the encoding**, it must run the following steps. This might happen if the encoding sniffing algorithm described above failed to find a character encoding, or if it found a character encoding that was not the actual encoding of the file.

1. If the encoding that is already being used to interpret the input stream is a UTF-16 encoding, then set the confidence to *certain* and abort these steps. The new encoding is ignored; if it was anything but the same encoding, then it would be clearly incorrect.

2. If the new encoding is a UTF-16 encoding, change it to UTF-8.

3. If the new encoding is identical or equivalent to the encoding that is already being used to interpret the input stream, then set the confidence to *certain* and abort these steps. This happens when the encoding information found in the file matches what the encoding sniffing algorithm determined to be the encoding, and in the second pass through the parser if the first pass found that the encoding sniffing algorithm described in the earlier section failed to find the right encoding.

4. If all the bytes up to the last byte converted by the current decoder have the same Unicode interpretations in both the current encoding and the new encoding, and if the user agent supports changing the converter on the fly, then the user agent may change to the new converter for the encoding on the fly. Set the document's character encoding and the encoding used to convert the input stream to the new encoding, set the confidence to *certain*, and abort these steps.

5. Otherwise, navigate to the document again, with replacement enabled, and using the same source browsing context, but this time skip the encoding sniffing algorithm and instead just set the encoding to the new encoding and the confidence to *certain*. Whenever possible, this should be done without actually contacting the network layer (the bytes should be re-parsed from memory), even if, e.g., the document is marked as not being cacheable. If this is not possible and contacting the network layer would involve repeating a request that uses a method other than HTTP GET (or equivalent for non-HTTP URLs), then instead set the confidence to *certain* and ignore the new encoding. The resource will be misinterpreted. User agents may notify the user of the situation, to aid in application development.

8.2.2.5 Preprocessing the input stream

The **input stream** consists of the characters pushed into it as the input byte stream is decoded or from the various APIs that directly manipulate the input stream.

One leading U+FEFF BYTE ORDER MARK character must be ignored if any are present in the input stream.

> **Note:** The requirement to strip a U+FEFF BYTE ORDER MARK character regardless of whether that character was used to determine the byte order is a willful violation of Unicode, motivated by a desire to increase the resilience of user agents in the face of naïve transcoders.

Any occurrences of any characters in the ranges U+0001 to U+0008, U+000E to U+001F, U+007F to U+009F, U+FDD0 to U+FDEF, and characters U+000B, U+FFFE, U+FFFF, U+1FFFE, U+1FFFF, U+2FFFE, U+2FFFF, U+3FFFE, U+3FFFF, U+4FFFE, U+4FFFF, U+5FFFE, U+5FFFF, U+6FFFE, U+6FFFF, U+7FFFE, U+7FFFF, U+8FFFE, U+8FFFF, U+9FFFE, U+9FFFF, U+AFFFE, U+AFFFF, U+BFFFE, U+BFFFF, U+CFFFE, U+CFFFF, U+DFFFE, U+DFFFF, U+EFFFE, U+EFFFF, U+FFFFE, U+FFFFF, U+10FFFE, and U+10FFFF are parse errors. These are all control characters or permanently undefined Unicode characters (noncharacters).

Any character that is a not a Unicode character, i.e. any isolated surrogate, is a parse error. (These can only find their way into the input stream via script APIs such as `document.write()`.)

"CR" (U+000D) characters and "LF" (U+000A) characters are treated specially. All CR characters must be converted to LF characters, and any LF characters that immediately follow a CR character must be ignored. Thus, newlines in HTML DOMs are represented by LF characters, and there are never any CR characters in the input to the tokenization stage.

The **next input character** is the first character in the input stream that has not yet been **consumed** or explicitly ignored by the requirements in this section. Initially, the *next input character* is the first character in the input. The **current input character** is the last character to have been *consumed*.

The **insertion point** is the position (just before a character or just before the end of the input stream) where content inserted using `document.write()` is actually inserted. The insertion point

is relative to the position of the character immediately after it, it is not an absolute offset into the input stream. Initially, the insertion point is undefined.

The "EOF" character in the tables below is a conceptual character representing the end of the input stream. If the parser is a script-created parser, then the end of the input stream is reached when an **explicit "EOF" character** (inserted by the `document.close()` method) is consumed. Otherwise, the "EOF" character is not a real character in the stream, but rather the lack of any further characters.

> **Note:** The handling of U+0000 NULL characters varies based on where the characters are found. In general, they are ignored except where doing so could plausibly introduce an attack vector. This handling is, by necessity, spread across both the tokenization stage and the tree construction stage.

8.2.3 Parse state

8.2.3.1 The insertion mode

The **insertion mode** is a state variable that controls the primary operation of the tree construction stage.

Initially, the insertion mode is "initial". It can change to "before html", "before head", "in head", "in head noscript", "after head", "in body", "text", "in table", "in table text", "in caption", "in column group", "in table body", "in row", "in cell", "in select", "in select in table", "in template", "after body", "in frameset", "after frameset", "after after body", and "after after frameset" during the course of the parsing, as described in the tree construction stage. The insertion mode affects how tokens are processed and whether CDATA sections are supported.

Several of these modes, namely "in head", "in body", "in table", and "in select", are special, in that the other modes defer to them at various times. When the algorithm below says that the user agent is to do something "**using the rules for** the *m* insertion mode", where *m* is one of these modes, the user agent must use the rules described under the *m* insertion mode's section, but must leave the insertion mode unchanged unless the rules in *m* themselves switch the insertion mode to a new value.

When the insertion mode is switched to "text" or "in table text", the **original insertion mode** is also set. This is the insertion mode to which the tree construction stage will return.

Similarly, to parse nested `template` elements, a **stack of template insertion modes** is used. It is initially empty. The **current template insertion mode** is the insertion mode that was most recently added to the stack of template insertion modes. The algorithms in the sections below will *push* insertion modes onto this stack, meaning that the specified insertion mode is to be added to the stack, and *pop* insertion modes from the stack, which means that the most recently added insertion mode must be removed from the stack.

When the steps below require the UA to **reset the insertion mode appropriately**, it means the UA must follow these steps:

1. Let *last* be false.
2. Let *node* be the last node in the stack of open elements.
3. *Loop*: If *node* is the first node in the stack of open elements, then set *last* to true, and, if the parser was originally created as part of the HTML fragment parsing algorithm (fragment

case) set *node* to the *context* element.

4. If *node* is a `select` element, run these substeps:
    1. If *last* is true, jump to the step below labeled *done*.
    2. Let *ancestor* be *node*.
    3. *Loop*: If *ancestor* is the first node in the stack of open elements, jump to the step below labeled *done*.
    4. Let *ancestor* be the node before *ancestor* in the stack of open elements.
    5. If *ancestor* is a `template` node, jump to the step below labeled *done*.
    6. If *ancestor* is a `table` node, switch the insertion mode to "in select in table" and abort these steps.
    7. Jump back to the step labeled *loop*.
    8. *Done*: Switch the insertion mode to "in select" and abort these steps.
5. If *node* is a `td` or `th` element and *last* is false, then switch the insertion mode to "in cell" and abort these steps.
6. If *node* is a `tr` element, then switch the insertion mode to "in row" and abort these steps.
7. If *node* is a `tbody`, `thead`, or `tfoot` element, then switch the insertion mode to "in table body" and abort these steps.
8. If *node* is a `caption` element, then switch the insertion mode to "in caption" and abort these steps.
9. If *node* is a `colgroup` element, then switch the insertion mode to "in column group" and abort these steps.
10. If *node* is a `table` element, then switch the insertion mode to "in table" and abort these steps.
11. If *node* is a `template` element, then switch the insertion mode to the current template insertion mode and abort these steps.
12. If *node* is a `head` element and *last* is true, then switch the insertion mode to "in body" ("in body"! *not "in head"*!) and abort these steps. (fragment case)
13. If *node* is a `head` element and *last* is false, then switch the insertion mode to "in head" and abort these steps.
14. If *node* is a `body` element, then switch the insertion mode to "in body" and abort these steps.
15. If *node* is a `frameset` element, then switch the insertion mode to "in frameset" and abort these steps. (fragment case)
16. If *node* is an `html` element, run these substeps:
    1. If the `head` element pointer is null, switch the insertion mode to "before head" and abort these steps. (fragment case)

2. Otherwise, the `head` element pointer is not null, switch the insertion mode to "after head" and abort these steps.

17. If *last* is true, then switch the insertion mode to "in body" and abort these steps. (fragment case)

18. Let *node* now be the node before *node* in the stack of open elements.

19. Return to the step labeled *loop*.

8.2.3.2 The stack of open elements

Initially, the **stack of open elements** is empty. The stack grows downwards; the topmost node on the stack is the first one added to the stack, and the bottommost node of the stack is the most recently added node in the stack (notwithstanding when the stack is manipulated in a random access fashion as part of the handling for misnested tags).

> **Note:** The "before html" insertion mode creates the `html` root element node, which is then added to the stack.

> **Note:** In the fragment case, the stack of open elements is initialized to contain an `html` element that is created as part of that algorithm. (The fragment case skips the "before html" insertion mode.)

The `html` node, however it is created, is the topmost node of the stack. It only gets popped off the stack when the parser finishes.

The **current node** is the bottommost node in this stack of open elements.

The **adjusted current node** is the *context* element if the stack of open elements has only one element in it and the parser was created by the HTML fragment parsing algorithm; otherwise, the adjusted current node is the current node.

Elements in the stack of open elements fall into the following categories:

Special
: The following elements have varying levels of special parsing rules: HTML's `address`, `applet`, `area`, `article`, `aside`, `base`, `basefont`, `bgsound`, `blockquote`, `body`, `br`, `button`, `caption`, `center`, `col`, `colgroup`, `dd`, `details`, `dir`, `div`, `dl`, `dt`, `embed`, `fieldset`, `figcaption`, `figure`, `footer`, `form`, `frame`, `frameset`, `h1`, `h2`, `h3`, `h4`, `h5`, `h6`, `head`, `header`, `hgroup`, `hr`, `html`, `iframe`, `img`, `input`, `isindex`, `li`, `link`, `listing`, `main`, `marquee`, `meta`, `nav`, `noembed`, `noframes`, `noscript`, `object`, `ol`, `p`, `param`, `plaintext`, `pre`, `script`, `section`, `select`, `source`, `style`, `summary`, `table`, `tbody`, `td`, `template`, `textarea`, `tfoot`, `th`, `thead`, `title`, `tr`, `track`, `ul`, `wbr`, and `xmp`; MathML's `mi`, `mo`, `mn`, `ms`, `mtext`, and `annotation-xml`; and SVG's `foreignObject`, `desc`, and `title`.

Formatting
: The following HTML elements are those that end up in the list of active formatting elements: `a`, `b`, `big`, `code`, `em`, `font`, `i`, `nobr`, `s`, `small`, `strike`, `strong`, `tt`, and `u`.

Ordinary
: All other elements found while parsing an HTML document.

The stack of open elements is said to **have an element *target node* in a specific scope**

consisting of a list of element types *list* when the following algorithm terminates in a match state:

1. Initialize *node* to be the current node (the bottommost node of the stack).
2. If *node* is the target node, terminate in a match state.
3. Otherwise, if *node* is one of the element types in *list*, terminate in a failure state.
4. Otherwise, set *node* to the previous entry in the stack of open elements and return to step 2. (This will never fail, since the loop will always terminate in the previous step if the top of the stack — an `html` element — is reached.)

The stack of open elements is said to **have a particular element in scope** when it has that element in the specific scope consisting of the following element types:

- `applet` in the HTML namespace
- `caption` in the HTML namespace
- `html` in the HTML namespace
- `table` in the HTML namespace
- `td` in the HTML namespace
- `th` in the HTML namespace
- `marquee` in the HTML namespace
- `object` in the HTML namespace
- `template` in the HTML namespace
- `mi` in the MathML namespace
- `mo` in the MathML namespace
- `mn` in the MathML namespace
- `ms` in the MathML namespace
- `mtext` in the MathML namespace
- `annotation-xml` in the MathML namespace
- `foreignObject` in the SVG namespace
- `desc` in the SVG namespace
- `title` in the SVG namespace

The stack of open elements is said to **have a particular element in list item scope** when it has that element in the specific scope consisting of the following element types:

- All the element types listed above for the *has an element in scope* algorithm.
- `ol` in the HTML namespace
- `ul` in the HTML namespace

The stack of open elements is said to **have a particular element in button scope** when it has that element in the specific scope consisting of the following element types:

- All the element types listed above for the *has an element in scope* algorithm.
- `button` in the HTML namespace

The stack of open elements is said to **have a particular element in table scope** when it has that element in the specific scope consisting of the following element types:

- `html` in the HTML namespace
- `table` in the HTML namespace
- `template` in the HTML namespace

The stack of open elements is said to **have a particular element in select scope** when it has that element in the specific scope consisting of all element types *except* the following:

- `optgroup` in the HTML namespace
- `option` in the HTML namespace

Nothing happens if at any time any of the elements in the stack of open elements are moved to a new location in, or removed from, the `Document` tree. In particular, the stack is not changed in this situation. This can cause, amongst other strange effects, content to be appended to nodes that are no longer in the DOM.

> **Note:** In some cases (namely, when closing misnested formatting elements), the stack is manipulated in a random-access fashion.

8.2.3.3 The list of active formatting elements

Initially, the **list of active formatting elements** is empty. It is used to handle mis-nested formatting element tags.

The list contains elements in the formatting category, and scope markers. The scope markers are inserted when entering `applet` elements, buttons, `object` elements, marquees, table cells, and table captions, and are used to prevent formatting from "leaking" *into* `applet` elements, buttons, `object` elements, marquees, and tables.

> **Note:** The scope markers are unrelated to the concept of an element being in scope.

In addition, each element in the list of active formatting elements is associated with the token for which it was created, so that further elements can be created for that token if necessary.

When the steps below require the UA to **push onto the list of active formatting elements** an element *element*, the UA must perform the following steps:

1. If there are already three elements in the list of active formatting elements after the last list marker, if any, or anywhere in the list if there are no list markers, that have the same tag name, namespace, and attributes as *element*, then remove the earliest such element from the list of active formatting elements. For these purposes, the attributes must be compared as they were when the elements were created by the parser; two elements have the same attributes if all their parsed attributes can be paired such that the two attributes in each pair have identical names, namespaces, and values (the order of the attributes does not matter).

   > **Note:** This is the Noah's Ark clause. But with three per family instead of two.

2. Add *element* to the list of active formatting elements.

When the steps below require the UA to **reconstruct the active formatting elements**, the UA must perform the following steps:

1. If there are no entries in the list of active formatting elements, then there is nothing to reconstruct; stop this algorithm.

2. If the last (most recently added) entry in the list of active formatting elements is a marker, or if it is an element that is in the stack of open elements, then there is nothing to reconstruct; stop this algorithm.

3. Let *entry* be the last (most recently added) element in the list of active formatting elements.

4. *Rewind*: If there are no entries before *entry* in the list of active formatting elements, then jump to the step labeled *create*.

5. Let *entry* be the entry one earlier than *entry* in the list of active formatting elements.
6. If *entry* is neither a marker nor an element that is also in the stack of open elements, go to the step labeled *rewind*.
7. *Advance*: Let *entry* be the element one later than *entry* in the list of active formatting elements.
8. *Create*: Insert an HTML element for the token for which the element *entry* was created, to obtain *new element*.
9. Replace the entry for *entry* in the list with an entry for *new element*.
10. If the entry for *new element* in the list of active formatting elements is not the last entry in the list, return to the step labeled *advance*.

This has the effect of reopening all the formatting elements that were opened in the current body, cell, or caption (whichever is youngest) that haven't been explicitly closed.

> **Note:** The way this specification is written, the list of active formatting elements always consists of elements in chronological order with the least recently added element first and the most recently added element last (except for while steps 8 to 11 of the above algorithm are being executed, of course).

When the steps below require the UA to **clear the list of active formatting elements up to the last marker**, the UA must perform the following steps:

1. Let *entry* be the last (most recently added) entry in the list of active formatting elements.
2. Remove *entry* from the list of active formatting elements.
3. If *entry* was a marker, then stop the algorithm at this point. The list has been cleared up to the last marker.
4. Go to step 1.

8.2.3.4 The element pointers

Initially, the **`head` element pointer** and the **`form` element pointer** are both null.

Once a `head` element has been parsed (whether implicitly or explicitly) the `head` element pointer gets set to point to this node.

The `form` element pointer points to the last `form` element that was opened and whose end tag has not yet been seen. It is used to make form controls associate with forms in the face of dramatically bad markup, for historical reasons. It is ignored inside `template` elements.

8.2.3.5 Other parsing state flags

The **scripting flag** is set to "enabled" if scripting was enabled for the `Document` with which the parser is associated when the parser was created, and "disabled" otherwise.

> **Note:** The scripting flag can be enabled even when the parser was originally created for the HTML fragment parsing algorithm, even though `script` elements don't execute

> in that case.

The **frameset-ok flag** is set to "ok" when the parser is created. It is set to "not ok" after certain tokens are seen.

8.2.4 Tokenization

Implementations must act as if they used the following state machine to tokenize HTML. The state machine must start in the data state. Most states consume a single character, which may have various side-effects, and either switches the state machine to a new state to *reconsume* the same character, or switches it to a new state to consume the next character, or stays in the same state to consume the next character. Some states have more complicated behavior and can consume several characters before switching to another state. In some cases, the tokenizer state is also changed by the tree construction stage.

The exact behavior of certain states depends on the insertion mode and the stack of open elements. Certain states also use a ***temporary buffer*** to track progress.

The output of the tokenization step is a series of zero or more of the following tokens: DOCTYPE, start tag, end tag, comment, character, end-of-file. DOCTYPE tokens have a name, a public identifier, a system identifier, and a *force-quirks flag*. When a DOCTYPE token is created, its name, public identifier, and system identifier must be marked as missing (which is a distinct state from the empty string), and the *force-quirks flag* must be set to *off* (its other state is *on*). Start and end tag tokens have a tag name, a *self-closing flag*, and a list of attributes, each of which has a name and a value. When a start or end tag token is created, its *self-closing flag* must be unset (its other state is that it be set), and its attributes list must be empty. Comment and character tokens have data.

When a token is emitted, it must immediately be handled by the tree construction stage. The tree construction stage can affect the state of the tokenization stage, and can insert additional characters into the stream. (For example, the `script` element can result in scripts executing and using the dynamic markup insertion APIs to insert characters into the stream being tokenized.)

> **Note:** Creating a token and emitting it are distinct actions. It is possible for a token to be created but implicitly abandoned (never emitted), e.g. if the file ends unexpectedly while processing the characters that are being parsed into a start tag token.

When a start tag token is emitted with its *self-closing flag* set, if the flag is not **acknowledged** when it is processed by the tree construction stage, that is a parse error.

When an end tag token is emitted with attributes, that is a parse error.

When an end tag token is emitted with its *self-closing flag* set, that is a parse error.

An **appropriate end tag token** is an end tag token whose tag name matches the tag name of the last start tag to have been emitted from this tokenizer, if any. If no start tag has been emitted from this tokenizer, then no end tag token is appropriate.

Before each step of the tokenizer, the user agent must first check the parser pause flag. If it is true, then the tokenizer must abort the processing of any nested invocations of the tokenizer, yielding control back to the caller.

The tokenizer state machine consists of the states defined in the following subsections.

8.2.4.1 Data state

Consume the next input character:

- **U+0026 AMPERSAND (&)**
  Switch to the character reference in data state.
- **"<" (U+003C)**
  Switch to the tag open state.
- **U+0000 NULL**
  Parse error. Emit the current input character as a character token.
- **EOF**
  Emit an end-of-file token.
- **Anything else**
  Emit the current input character as a character token.

8.2.4.2 Character reference in data state

Switch to the data state.

Attempt to consume a character reference, with no additional allowed character.

If nothing is returned, emit a U+0026 AMPERSAND character (&) token.

Otherwise, emit the character tokens that were returned.

8.2.4.3 RCDATA state

Consume the next input character:

- **U+0026 AMPERSAND (&)**
  Switch to the character reference in RCDATA state.
- **"<" (U+003C)**
  Switch to the RCDATA less-than sign state.
- **U+0000 NULL**
  Parse error. Emit a U+FFFD REPLACEMENT CHARACTER character token.
- **EOF**
  Emit an end-of-file token.
- **Anything else**
  Emit the current input character as a character token.

8.2.4.4 Character reference in RCDATA state

Switch to the RCDATA state.

Attempt to consume a character reference, with no additional allowed character.

If nothing is returned, emit a U+0026 AMPERSAND character (&) token.

Otherwise, emit the character tokens that were returned.

8.2.4.5 RAWTEXT state

Consume the next input character:

- **"<" (U+003C)**
  Switch to the RAWTEXT less-than sign state.
- **U+0000 NULL**
  Parse error. Emit a U+FFFD REPLACEMENT CHARACTER character token.
- **EOF**
  Emit an end-of-file token.
- **Anything else**
  Emit the current input character as a character token.

8.2.4.6 Script data state

Consume the next input character:

- **"<" (U+003C)**
  Switch to the script data less-than sign state.
- **U+0000 NULL**
  Parse error. Emit a U+FFFD REPLACEMENT CHARACTER character token.
- **EOF**
  Emit an end-of-file token.
- **Anything else**
  Emit the current input character as a character token.

8.2.4.7 PLAINTEXT state

Consume the next input character:

- **U+0000 NULL**
  Parse error. Emit a U+FFFD REPLACEMENT CHARACTER character token.
- **EOF**
  Emit an end-of-file token.
- **Anything else**
  Emit the current input character as a character token.

8.2.4.8 Tag open state

Consume the next input character:

- **"!" (U+0021)**
  Switch to the markup declaration open state.
- **"/" (U+002F)**
  Switch to the end tag open state.
- **Uppercase ASCII letter**
  Create a new start tag token, set its tag name to the lowercase version of the current input character (add 0x0020 to the character's code point), then switch to the tag name state. (Don't emit the token yet; further details will be filled in before it is emitted.)
- **Lowercase ASCII letter**
  Create a new start tag token, set its tag name to the current input character, then switch to the tag name state. (Don't emit the token yet; further details will be filled in before it is emitted.)
- **"?" (U+003F)**
  Parse error. Switch to the bogus comment state.

- **Anything else**
  Parse error. Switch to the data state. Emit a U+003C LESS-THAN SIGN character token. Reconsume the current input character.

8.2.4.9 End tag open state

Consume the next input character:

- **Uppercase ASCII letter**
  Create a new end tag token, set its tag name to the lowercase version of the current input character (add 0x0020 to the character's code point), then switch to the tag name state. (Don't emit the token yet; further details will be filled in before it is emitted.)
- **Lowercase ASCII letter**
  Create a new end tag token, set its tag name to the current input character, then switch to the tag name state. (Don't emit the token yet; further details will be filled in before it is emitted.)
- **">" (U+003E)**
  Parse error. Switch to the data state.
- **EOF**
  Parse error. Switch to the data state. Emit a U+003C LESS-THAN SIGN character token and a U+002F SOLIDUS character token. Reconsume the EOF character.
- **Anything else**
  Parse error. Switch to the bogus comment state.

8.2.4.10 Tag name state

Consume the next input character:

- **"tab" (U+0009)**
- **"LF" (U+000A)**
- **"FF" (U+000C)**
- **U+0020 SPACE**
  Switch to the before attribute name state.
- **"/" (U+002F)**
  Switch to the self-closing start tag state.
- **">" (U+003E)**
  Switch to the data state. Emit the current tag token.
- **Uppercase ASCII letter**
  Append the lowercase version of the current input character (add 0x0020 to the character's code point) to the current tag token's tag name.
- **U+0000 NULL**
  Parse error. Append a U+FFFD REPLACEMENT CHARACTER character to the current tag token's tag name.
- **EOF**
  Parse error. Switch to the data state. Reconsume the EOF character.
- **Anything else**
  Append the current input character to the current tag token's tag name.

8.2.4.11 RCDATA less-than sign state

Consume the next input character:

- **"/" (U+002F)**

Set the *temporary buffer* to the empty string. Switch to the RCDATA end tag open state.

↪ **Anything else**
Switch to the RCDATA state. Emit a U+003C LESS-THAN SIGN character token. Reconsume the current input character.

8.2.4.12 RCDATA end tag open state

Consume the next input character:

↪ **Uppercase ASCII letter**
Create a new end tag token, and set its tag name to the lowercase version of the current input character (add 0x0020 to the character's code point). Append the current input character to the *temporary buffer*. Finally, switch to the RCDATA end tag name state. (Don't emit the token yet; further details will be filled in before it is emitted.)

↪ **Lowercase ASCII letter**
Create a new end tag token, and set its tag name to the current input character. Append the current input character to the *temporary buffer*. Finally, switch to the RCDATA end tag name state. (Don't emit the token yet; further details will be filled in before it is emitted.)

↪ **Anything else**
Switch to the RCDATA state. Emit a U+003C LESS-THAN SIGN character token and a U+002F SOLIDUS character token. Reconsume the current input character.

8.2.4.13 RCDATA end tag name state

Consume the next input character:

↪ **"tab" (U+0009)**
↪ **"LF" (U+000A)**
↪ **"FF" (U+000C)**
↪ **U+0020 SPACE**
If the current end tag token is an appropriate end tag token, then switch to the before attribute name state. Otherwise, treat it as per the "anything else" entry below.

↪ **"/" (U+002F)**
If the current end tag token is an appropriate end tag token, then switch to the self-closing start tag state. Otherwise, treat it as per the "anything else" entry below.

↪ **">" (U+003E)**
If the current end tag token is an appropriate end tag token, then switch to the data state and emit the current tag token. Otherwise, treat it as per the "anything else" entry below.

↪ **Uppercase ASCII letter**
Append the lowercase version of the current input character (add 0x0020 to the character's code point) to the current tag token's tag name. Append the current input character to the *temporary buffer*.

↪ **Lowercase ASCII letter**
Append the current input character to the current tag token's tag name. Append the current input character to the *temporary buffer*.

↪ **Anything else**
Switch to the RCDATA state. Emit a U+003C LESS-THAN SIGN character token, a U+002F SOLIDUS character token, and a character token for each of the characters in the *temporary buffer* (in the order they were added to the buffer). Reconsume the current input character.

8.2.4.14 RAWTEXT less-than sign state

Consume the next input character:

- **"/" (U+002F)**
  Set the *temporary buffer* to the empty string. Switch to the RAWTEXT end tag open state.
- **Anything else**
  Switch to the RAWTEXT state. Emit a U+003C LESS-THAN SIGN character token. Reconsume the current input character.

8.2.4.15 RAWTEXT end tag open state

Consume the next input character:

- **Uppercase ASCII letter**
  Create a new end tag token, and set its tag name to the lowercase version of the current input character (add 0x0020 to the character's code point). Append the current input character to the *temporary buffer*. Finally, switch to the RAWTEXT end tag name state. (Don't emit the token yet; further details will be filled in before it is emitted.)
- **Lowercase ASCII letter**
  Create a new end tag token, and set its tag name to the current input character. Append the current input character to the *temporary buffer*. Finally, switch to the RAWTEXT end tag name state. (Don't emit the token yet; further details will be filled in before it is emitted.)
- **Anything else**
  Switch to the RAWTEXT state. Emit a U+003C LESS-THAN SIGN character token and a U+002F SOLIDUS character token. Reconsume the current input character.

8.2.4.16 RAWTEXT end tag name state

Consume the next input character:

- **"tab" (U+0009)**
- **"LF" (U+000A)**
- **"FF" (U+000C)**
- **U+0020 SPACE**
  If the current end tag token is an appropriate end tag token, then switch to the before attribute name state. Otherwise, treat it as per the "anything else" entry below.
- **"/" (U+002F)**
  If the current end tag token is an appropriate end tag token, then switch to the self-closing start tag state. Otherwise, treat it as per the "anything else" entry below.
- **">" (U+003E)**
  If the current end tag token is an appropriate end tag token, then switch to the data state and emit the current tag token. Otherwise, treat it as per the "anything else" entry below.
- **Uppercase ASCII letter**
  Append the lowercase version of the current input character (add 0x0020 to the character's code point) to the current tag token's tag name. Append the current input character to the *temporary buffer*.
- **Lowercase ASCII letter**
  Append the current input character to the current tag token's tag name. Append the current input character to the *temporary buffer*.
- **Anything else**

Switch to the RAWTEXT state. Emit a U+003C LESS-THAN SIGN character token, a U+002F SOLIDUS character token, and a character token for each of the characters in the *temporary buffer* (in the order they were added to the buffer). Reconsume the current input character.

8.2.4.17 Script data less-than sign state

Consume the next input character:

- **"/" (U+002F)**
  Set the *temporary buffer* to the empty string. Switch to the script data end tag open state.
- **"!" (U+0021)**
  Switch to the script data escape start state. Emit a U+003C LESS-THAN SIGN character token and a U+0021 EXCLAMATION MARK character token.
- **Anything else**
  Switch to the script data state. Emit a U+003C LESS-THAN SIGN character token. Reconsume the current input character.

8.2.4.18 Script data end tag open state

Consume the next input character:

- **Uppercase ASCII letter**
  Create a new end tag token, and set its tag name to the lowercase version of the current input character (add 0x0020 to the character's code point). Append the current input character to the *temporary buffer*. Finally, switch to the script data end tag name state. (Don't emit the token yet; further details will be filled in before it is emitted.)
- **Lowercase ASCII letter**
  Create a new end tag token, and set its tag name to the current input character. Append the current input character to the *temporary buffer*. Finally, switch to the script data end tag name state. (Don't emit the token yet; further details will be filled in before it is emitted.)
- **Anything else**
  Switch to the script data state. Emit a U+003C LESS-THAN SIGN character token and a U+002F SOLIDUS character token. Reconsume the current input character.

8.2.4.19 Script data end tag name state

Consume the next input character:

- **"tab" (U+0009)**
- **"LF" (U+000A)**
- **"FF" (U+000C)**
- **U+0020 SPACE**
  If the current end tag token is an appropriate end tag token, then switch to the before attribute name state. Otherwise, treat it as per the "anything else" entry below.
- **"/" (U+002F)**
  If the current end tag token is an appropriate end tag token, then switch to the self-closing start tag state. Otherwise, treat it as per the "anything else" entry below.
- **">" (U+003E)**
  If the current end tag token is an appropriate end tag token, then switch to the data state and emit the current tag token. Otherwise, treat it as per the "anything else" entry

below.

↪ **Uppercase ASCII letter**
Append the lowercase version of the current input character (add 0x0020 to the character's code point) to the current tag token's tag name. Append the current input character to the *temporary buffer*.

↪ **Lowercase ASCII letter**
Append the current input character to the current tag token's tag name. Append the current input character to the *temporary buffer*.

↪ **Anything else**
Switch to the script data state. Emit a U+003C LESS-THAN SIGN character token, a U+002F SOLIDUS character token, and a character token for each of the characters in the *temporary buffer* (in the order they were added to the buffer). Reconsume the current input character.

8.2.4.20 Script data escape start state

Consume the next input character:

↪ **"-" (U+002D)**
Switch to the script data escape start dash state. Emit a U+002D HYPHEN-MINUS character token.

↪ **Anything else**
Switch to the script data state. Reconsume the current input character.

8.2.4.21 Script data escape start dash state

Consume the next input character:

↪ **"-" (U+002D)**
Switch to the script data escaped dash dash state. Emit a U+002D HYPHEN-MINUS character token.

↪ **Anything else**
Switch to the script data state. Reconsume the current input character.

8.2.4.22 Script data escaped state

Consume the next input character:

↪ **"-" (U+002D)**
Switch to the script data escaped dash state. Emit a U+002D HYPHEN-MINUS character token.

↪ **"<" (U+003C)**
Switch to the script data escaped less-than sign state.

↪ **U+0000 NULL**
Parse error. Emit a U+FFFD REPLACEMENT CHARACTER character token.

↪ **EOF**
Switch to the data state. Parse error. Reconsume the EOF character.

↪ **Anything else**
Emit the current input character as a character token.

8.2.4.23 Script data escaped dash state

Consume the next input character:

- **"-" (U+002D)**
  Switch to the script data escaped dash dash state. Emit a U+002D HYPHEN-MINUS character token.
- **"<" (U+003C)**
  Switch to the script data escaped less-than sign state.
- **U+0000 NULL**
  Parse error. Switch to the script data escaped state. Emit a U+FFFD REPLACEMENT CHARACTER character token.
- **EOF**
  Parse error. Switch to the data state. Reconsume the EOF character.
- **Anything else**
  Switch to the script data escaped state. Emit the current input character as a character token.

8.2.4.24 Script data escaped dash dash state

Consume the next input character:

- **"-" (U+002D)**
  Emit a U+002D HYPHEN-MINUS character token.
- **"<" (U+003C)**
  Switch to the script data escaped less-than sign state.
- **">" (U+003E)**
  Switch to the script data state. Emit a U+003E GREATER-THAN SIGN character token.
- **U+0000 NULL**
  Parse error. Switch to the script data escaped state. Emit a U+FFFD REPLACEMENT CHARACTER character token.
- **EOF**
  Parse error. Switch to the data state. Reconsume the EOF character.
- **Anything else**
  Switch to the script data escaped state. Emit the current input character as a character token.

8.2.4.25 Script data escaped less-than sign state

Consume the next input character:

- **"/" (U+002F)**
  Set the *temporary buffer* to the empty string. Switch to the script data escaped end tag open state.
- **Uppercase ASCII letter**
  Set the *temporary buffer* to the empty string. Append the lowercase version of the current input character (add 0x0020 to the character's code point) to the *temporary buffer*. Switch to the script data double escape start state. Emit a U+003C LESS-THAN SIGN character token and the current input character as a character token.
- **Lowercase ASCII letter**
  Set the *temporary buffer* to the empty string. Append the current input character to the *temporary buffer*. Switch to the script data double escape start state. Emit a U+003C LESS-THAN SIGN character token and the current input character as a character token.
- **Anything else**

Switch to the script data escaped state. Emit a U+003C LESS-THAN SIGN character token. Reconsume the current input character.

8.2.4.26 Script data escaped end tag open state

Consume the next input character:

- **Uppercase ASCII letter**
  Create a new end tag token, and set its tag name to the lowercase version of the current input character (add 0x0020 to the character's code point). Append the current input character to the *temporary buffer*. Finally, switch to the script data escaped end tag name state. (Don't emit the token yet; further details will be filled in before it is emitted.)
- **Lowercase ASCII letter**
  Create a new end tag token, and set its tag name to the current input character. Append the current input character to the *temporary buffer*. Finally, switch to the script data escaped end tag name state. (Don't emit the token yet; further details will be filled in before it is emitted.)
- **Anything else**
  Switch to the script data escaped state. Emit a U+003C LESS-THAN SIGN character token and a U+002F SOLIDUS character token. Reconsume the current input character.

8.2.4.27 Script data escaped end tag name state

Consume the next input character:

- **"tab" (U+0009)**
- **"LF" (U+000A)**
- **"FF" (U+000C)**
- **U+0020 SPACE**
  If the current end tag token is an appropriate end tag token, then switch to the before attribute name state. Otherwise, treat it as per the "anything else" entry below.
- **"/" (U+002F)**
  If the current end tag token is an appropriate end tag token, then switch to the self-closing start tag state. Otherwise, treat it as per the "anything else" entry below.
- **">" (U+003E)**
  If the current end tag token is an appropriate end tag token, then switch to the data state and emit the current tag token. Otherwise, treat it as per the "anything else" entry below.
- **Uppercase ASCII letter**
  Append the lowercase version of the current input character (add 0x0020 to the character's code point) to the current tag token's tag name. Append the current input character to the *temporary buffer*.
- **Lowercase ASCII letter**
  Append the current input character to the current tag token's tag name. Append the current input character to the *temporary buffer*.
- **Anything else**
  Switch to the script data escaped state. Emit a U+003C LESS-THAN SIGN character token, a U+002F SOLIDUS character token, and a character token for each of the characters in the *temporary buffer* (in the order they were added to the buffer). Reconsume the current input character.

8.2.4.28 Script data double escape start state

Consume the next input character:

- **"tab" (U+0009)**
- **"LF" (U+000A)**
- **"FF" (U+000C)**
- **U+0020 SPACE**
- **"/" (U+002F)**
- **">" (U+003E)**
  If the *temporary buffer* is the string "`script`", then switch to the script data double escaped state. Otherwise, switch to the script data escaped state. Emit the current input character as a character token.
- **Uppercase ASCII letter**
  Append the lowercase version of the current input character (add 0x0020 to the character's code point) to the *temporary buffer*. Emit the current input character as a character token.
- **Lowercase ASCII letter**
  Append the current input character to the *temporary buffer*. Emit the current input character as a character token.
- **Anything else**
  Switch to the script data escaped state. Reconsume the current input character.

8.2.4.29 Script data double escaped state

Consume the next input character:

- **"-" (U+002D)**
  Switch to the script data double escaped dash state. Emit a U+002D HYPHEN-MINUS character token.
- **"<" (U+003C)**
  Switch to the script data double escaped less-than sign state. Emit a U+003C LESS-THAN SIGN character token.
- **U+0000 NULL**
  Parse error. Emit a U+FFFD REPLACEMENT CHARACTER character token.
- **EOF**
  Parse error. Switch to the data state. Reconsume the EOF character.
- **Anything else**
  Emit the current input character as a character token.

8.2.4.30 Script data double escaped dash state

Consume the next input character:

- **"-" (U+002D)**
  Switch to the script data double escaped dash dash state. Emit a U+002D HYPHEN-MINUS character token.
- **"<" (U+003C)**
  Switch to the script data double escaped less-than sign state. Emit a U+003C LESS-THAN SIGN character token.
- **U+0000 NULL**
  Parse error. Switch to the script data double escaped state. Emit a U+FFFD REPLACEMENT CHARACTER character token.
- **EOF**

Parse error. Switch to the data state. Reconsume the EOF character.

↪ **Anything else**
Switch to the script data double escaped state. Emit the current input character as a character token.

8.2.4.31 Script data double escaped dash dash state

Consume the next input character:

↪ **"-" (U+002D)**
Emit a U+002D HYPHEN-MINUS character token.

↪ **"<" (U+003C)**
Switch to the script data double escaped less-than sign state. Emit a U+003C LESS-THAN SIGN character token.

↪ **">" (U+003E)**
Switch to the script data state. Emit a U+003E GREATER-THAN SIGN character token.

↪ **U+0000 NULL**
Parse error. Switch to the script data double escaped state. Emit a U+FFFD REPLACEMENT CHARACTER character token.

↪ **EOF**
Parse error. Switch to the data state. Reconsume the EOF character.

↪ **Anything else**
Switch to the script data double escaped state. Emit the current input character as a character token.

8.2.4.32 Script data double escaped less-than sign state

Consume the next input character:

↪ **"/" (U+002F)**
Set the *temporary buffer* to the empty string. Switch to the script data double escape end state. Emit a U+002F SOLIDUS character token.

↪ **Anything else**
Switch to the script data double escaped state. Reconsume the current input character.

8.2.4.33 Script data double escape end state

Consume the next input character:

↪ **"tab" (U+0009)**
↪ **"LF" (U+000A)**
↪ **"FF" (U+000C)**
↪ **U+0020 SPACE**
↪ **"/" (U+002F)**
↪ **">" (U+003E)**
If the *temporary buffer* is the string "`script`", then switch to the script data escaped state. Otherwise, switch to the script data double escaped state. Emit the current input character as a character token.

↪ **Uppercase ASCII letter**
Append the lowercase version of the current input character (add 0x0020 to the character's code point) to the *temporary buffer*. Emit the current input character as a

character token.

↪ **Lowercase ASCII letter**
Append the current input character to the *temporary buffer*. Emit the current input character as a character token.

↪ **Anything else**
Switch to the script data double escaped state. Reconsume the current input character.

8.2.4.34 Before attribute name state

Consume the next input character:

↪ **"tab" (U+0009)**
↪ **"LF" (U+000A)**
↪ **"FF" (U+000C)**
↪ **U+0020 SPACE**
Ignore the character.

↪ **"/" (U+002F)**
Switch to the self-closing start tag state.

↪ **">" (U+003E)**
Switch to the data state. Emit the current tag token.

↪ **Uppercase ASCII letter**
Start a new attribute in the current tag token. Set that attribute's name to the lowercase version of the current input character (add 0x0020 to the character's code point), and its value to the empty string. Switch to the attribute name state.

↪ **U+0000 NULL**
Parse error. Start a new attribute in the current tag token. Set that attribute's name to a U+FFFD REPLACEMENT CHARACTER character, and its value to the empty string. Switch to the attribute name state.

↪ **U+0022 QUOTATION MARK (")**
↪ **"'" (U+0027)**
↪ **"<" (U+003C)**
↪ **"=" (U+003D)**
Parse error. Treat it as per the "anything else" entry below.

↪ **EOF**
Parse error. Switch to the data state. Reconsume the EOF character.

↪ **Anything else**
Start a new attribute in the current tag token. Set that attribute's name to the current input character, and its value to the empty string. Switch to the attribute name state.

8.2.4.35 Attribute name state

Consume the next input character:

↪ **"tab" (U+0009)**
↪ **"LF" (U+000A)**
↪ **"FF" (U+000C)**
↪ **U+0020 SPACE**
Switch to the after attribute name state.

↪ **"/" (U+002F)**
Switch to the self-closing start tag state.

↪ **"=" (U+003D)**
Switch to the before attribute value state.

↪ **">" (U+003E)**

Switch to the data state. Emit the current tag token.

↪ **Uppercase ASCII letter**
Append the lowercase version of the current input character (add 0x0020 to the character's code point) to the current attribute's name.

↪ **U+0000 NULL**
Parse error. Append a U+FFFD REPLACEMENT CHARACTER character to the current attribute's name.

↪ **U+0022 QUOTATION MARK (")**

↪ **"'" (U+0027)**

↪ **"<" (U+003C)**
Parse error. Treat it as per the "anything else" entry below.

↪ **EOF**
Parse error. Switch to the data state. Reconsume the EOF character.

↪ **Anything else**
Append the current input character to the current attribute's name.

When the user agent leaves the attribute name state (and before emitting the tag token, if appropriate), the complete attribute's name must be compared to the other attributes on the same token; if there is already an attribute on the token with the exact same name, then this is a parse error and the new attribute must be removed from the token.

> **Note:** If an attribute is so removed from a token, it, along with the value that gets associated with it, if any, are never subsequently used by the parser, and are therefore effectively discarded. Removing the attribute in this way does not change its status as the "current attribute" for the purposes of the tokenizer, however.

8.2.4.36 After attribute name state

Consume the next input character:

↪ **"tab" (U+0009)**

↪ **"LF" (U+000A)**

↪ **"FF" (U+000C)**

↪ **U+0020 SPACE**
Ignore the character.

↪ **"/" (U+002F)**
Switch to the self-closing start tag state.

↪ **"=" (U+003D)**
Switch to the before attribute value state.

↪ **">" (U+003E)**
Switch to the data state. Emit the current tag token.

↪ **Uppercase ASCII letter**
Start a new attribute in the current tag token. Set that attribute's name to the lowercase version of the current input character (add 0x0020 to the character's code point), and its value to the empty string. Switch to the attribute name state.

↪ **U+0000 NULL**
Parse error. Start a new attribute in the current tag token. Set that attribute's name to a U+FFFD REPLACEMENT CHARACTER character, and its value to the empty string. Switch to the attribute name state.

↪ **U+0022 QUOTATION MARK (")**

↪ **"'" (U+0027)**

↪ **"<" (U+003C)**
Parse error. Treat it as per the "anything else" entry below.

↪ **EOF**

Parse error. Switch to the data state. Reconsume the EOF character.

- **Anything else**
  Start a new attribute in the current tag token. Set that attribute's name to the current input character, and its value to the empty string. Switch to the attribute name state.

8.2.4.37 Before attribute value state

Consume the next input character:

- **"tab" (U+0009)**
- **"LF" (U+000A)**
- **"FF" (U+000C)**
- **U+0020 SPACE**
  Ignore the character.
- **U+0022 QUOTATION MARK (")**
  Switch to the attribute value (double-quoted) state.
- **U+0026 AMPERSAND (&)**
  Switch to the attribute value (unquoted) state. Reconsume the current input character.
- **"'" (U+0027)**
  Switch to the attribute value (single-quoted) state.
- **U+0000 NULL**
  Parse error. Append a U+FFFD REPLACEMENT CHARACTER character to the current attribute's value. Switch to the attribute value (unquoted) state.
- **">" (U+003E)**
  Parse error. Switch to the data state. Emit the current tag token.
- **"<" (U+003C)**
- **"=" (U+003D)**
- **"`" (U+0060)**
  Parse error. Treat it as per the "anything else" entry below.
- **EOF**
  Parse error. Switch to the data state. Reconsume the EOF character.
- **Anything else**
  Append the current input character to the current attribute's value. Switch to the attribute value (unquoted) state.

8.2.4.38 Attribute value (double-quoted) state

Consume the next input character:

- **U+0022 QUOTATION MARK (")**
  Switch to the after attribute value (quoted) state.
- **U+0026 AMPERSAND (&)**
  Switch to the character reference in attribute value state, with the additional allowed character being U+0022 QUOTATION MARK (").
- **U+0000 NULL**
  Parse error. Append a U+FFFD REPLACEMENT CHARACTER character to the current attribute's value.
- **EOF**
  Parse error. Switch to the data state. Reconsume the EOF character.
- **Anything else**
  Append the current input character to the current attribute's value.

8.2.4.39 Attribute value (single-quoted) state

Consume the next input character:

- **"'" (U+0027)**
  Switch to the after attribute value (quoted) state.
- **U+0026 AMPERSAND (&)**
  Switch to the character reference in attribute value state, with the additional allowed character being "'" (U+0027).
- **U+0000 NULL**
  Parse error. Append a U+FFFD REPLACEMENT CHARACTER character to the current attribute's value.
- **EOF**
  Parse error. Switch to the data state. Reconsume the EOF character.
- **Anything else**
  Append the current input character to the current attribute's value.

8.2.4.40 Attribute value (unquoted) state

Consume the next input character:

- **"tab" (U+0009)**
- **"LF" (U+000A)**
- **"FF" (U+000C)**
- **U+0020 SPACE**
  Switch to the before attribute name state.
- **U+0026 AMPERSAND (&)**
  Switch to the character reference in attribute value state, with the additional allowed character being ">" (U+003E).
- **">" (U+003E)**
  Switch to the data state. Emit the current tag token.
- **U+0000 NULL**
  Parse error. Append a U+FFFD REPLACEMENT CHARACTER character to the current attribute's value.
- **U+0022 QUOTATION MARK (")**
- **"'" (U+0027)**
- **"<" (U+003C)**
- **"=" (U+003D)**
- **"`" (U+0060)**
  Parse error. Treat it as per the "anything else" entry below.
- **EOF**
  Parse error. Switch to the data state. Reconsume the EOF character.
- **Anything else**
  Append the current input character to the current attribute's value.

8.2.4.41 Character reference in attribute value state

Attempt to consume a character reference.

If nothing is returned, append a U+0026 AMPERSAND character (&) to the current attribute's value.

Otherwise, append the returned character tokens to the current attribute's value.

Finally, switch back to the attribute value state that switched into this state.

8.2.4.42 After attribute value (quoted) state

Consume the next input character:

- **"tab" (U+0009)**
- **"LF" (U+000A)**
- **"FF" (U+000C)**
- **U+0020 SPACE**
  Switch to the before attribute name state.
- **"/" (U+002F)**
  Switch to the self-closing start tag state.
- **">" (U+003E)**
  Switch to the data state. Emit the current tag token.
- **EOF**
  Parse error. Switch to the data state. Reconsume the EOF character.
- **Anything else**
  Parse error. Switch to the before attribute name state. Reconsume the character.

8.2.4.43 Self-closing start tag state

Consume the next input character:

- **">" (U+003E)**
  Set the *self-closing flag* of the current tag token. Switch to the data state. Emit the current tag token.
- **EOF**
  Parse error. Switch to the data state. Reconsume the EOF character.
- **Anything else**
  Parse error. Switch to the before attribute name state. Reconsume the character.

8.2.4.44 Bogus comment state

Consume every character up to and including the first ">" (U+003E) character or the end of the file (EOF), whichever comes first. Emit a comment token whose data is the concatenation of all the characters starting from and including the character that caused the state machine to switch into the bogus comment state, up to and including the character immediately before the last consumed character (i.e. up to the character just before the U+003E or EOF character), but with any U+0000 NULL characters replaced by U+FFFD REPLACEMENT CHARACTER characters. (If the comment was started by the end of the file (EOF), the token is empty. Similarly, the token is empty if it was generated by the string "<!>".)

Switch to the data state.

If the end of the file was reached, reconsume the EOF character.

8.2.4.45 Markup declaration open state

If the next two characters are both "-" (U+002D) characters, consume those two characters, create a comment token whose data is the empty string, and switch to the comment start state.

Otherwise, if the next seven characters are an ASCII case-insensitive match for the word "DOCTYPE", then consume those characters and switch to the DOCTYPE state.

Otherwise, if there is an adjusted current node and it is not an element in the HTML namespace and the next seven characters are a case-sensitive match for the string "[CDATA[" (the five uppercase letters "CDATA" with a U+005B LEFT SQUARE BRACKET character before and after), then consume those characters and switch to the CDATA section state.

Otherwise, this is a parse error. Switch to the bogus comment state. The next character that is consumed, if any, is the first character that will be in the comment.

8.2.4.46 Comment start state

Consume the next input character:

- **"-" (U+002D)**
  Switch to the comment start dash state.
- **U+0000 NULL**
  Parse error. Append a U+FFFD REPLACEMENT CHARACTER character to the comment token's data. Switch to the comment state.
- **">" (U+003E)**
  Parse error. Switch to the data state. Emit the comment token.
- **EOF**
  Parse error. Switch to the data state. Emit the comment token. Reconsume the EOF character.
- **Anything else**
  Append the current input character to the comment token's data. Switch to the comment state.

8.2.4.47 Comment start dash state

Consume the next input character:

- **"-" (U+002D)**
  Switch to the comment end state
- **U+0000 NULL**
  Parse error. Append a "-" (U+002D) character and a U+FFFD REPLACEMENT CHARACTER character to the comment token's data. Switch to the comment state.
- **">" (U+003E)**
  Parse error. Switch to the data state. Emit the comment token.
- **EOF**
  Parse error. Switch to the data state. Emit the comment token. Reconsume the EOF character.
- **Anything else**
  Append a "-" (U+002D) character and the current input character to the comment token's data. Switch to the comment state.

8.2.4.48 Comment state

Consume the next input character:

- **"-" (U+002D)**
  Switch to the comment end dash state
- **U+0000 NULL**
  Parse error. Append a U+FFFD REPLACEMENT CHARACTER character to the comment token's data.

- **EOF**
  Parse error. Switch to the data state. Emit the comment token. Reconsume the EOF character.
- **Anything else**
  Append the current input character to the comment token's data.

8.2.4.49 Comment end dash state

Consume the next input character:

- **"-" (U+002D)**
  Switch to the comment end state
- **U+0000 NULL**
  Parse error. Append a "-" (U+002D) character and a U+FFFD REPLACEMENT CHARACTER character to the comment token's data. Switch to the comment state.
- **EOF**
  Parse error. Switch to the data state. Emit the comment token. Reconsume the EOF character.
- **Anything else**
  Append a "-" (U+002D) character and the current input character to the comment token's data. Switch to the comment state.

8.2.4.50 Comment end state

Consume the next input character:

- **">" (U+003E)**
  Switch to the data state. Emit the comment token.
- **U+0000 NULL**
  Parse error. Append two "-" (U+002D) characters and a U+FFFD REPLACEMENT CHARACTER character to the comment token's data. Switch to the comment state.
- **"!" (U+0021)**
  Parse error. Switch to the comment end bang state.
- **"-" (U+002D)**
  Parse error. Append a "-" (U+002D) character to the comment token's data.
- **EOF**
  Parse error. Switch to the data state. Emit the comment token. Reconsume the EOF character.
- **Anything else**
  Parse error. Append two "-" (U+002D) characters and the current input character to the comment token's data. Switch to the comment state.

8.2.4.51 Comment end bang state

Consume the next input character:

- **"-" (U+002D)**
  Append two "-" (U+002D) characters and a "!" (U+0021) character to the comment token's data. Switch to the comment end dash state.
- **">" (U+003E)**
  Switch to the data state. Emit the comment token.
- **U+0000 NULL**
  Parse error. Append two "-" (U+002D) characters, a "!" (U+0021) character, and a

U+FFFD REPLACEMENT CHARACTER character to the comment token's data. Switch to the comment state.

↪ **EOF**
Parse error. Switch to the data state. Emit the comment token. Reconsume the EOF character.

↪ **Anything else**
Append two "-" (U+002D) characters, a "!" (U+0021) character, and the current input character to the comment token's data. Switch to the comment state.

8.2.4.52 DOCTYPE state

Consume the next input character:

↪ **"tab" (U+0009)**
↪ **"LF" (U+000A)**
↪ **"FF" (U+000C)**
↪ **U+0020 SPACE**
Switch to the before DOCTYPE name state.

↪ **EOF**
Parse error. Switch to the data state. Create a new DOCTYPE token. Set its *force-quirks flag* to *on*. Emit the token. Reconsume the EOF character.

↪ **Anything else**
Parse error. Switch to the before DOCTYPE name state. Reconsume the character.

8.2.4.53 Before DOCTYPE name state

Consume the next input character:

↪ **"tab" (U+0009)**
↪ **"LF" (U+000A)**
↪ **"FF" (U+000C)**
↪ **U+0020 SPACE**
Ignore the character.

↪ **Uppercase ASCII letter**
Create a new DOCTYPE token. Set the token's name to the lowercase version of the current input character (add 0x0020 to the character's code point). Switch to the DOCTYPE name state.

↪ **U+0000 NULL**
Parse error. Create a new DOCTYPE token. Set the token's name to a U+FFFD REPLACEMENT CHARACTER character. Switch to the DOCTYPE name state.

↪ **">" (U+003E)**
Parse error. Create a new DOCTYPE token. Set its *force-quirks flag* to *on*. Switch to the data state. Emit the token.

↪ **EOF**
Parse error. Switch to the data state. Create a new DOCTYPE token. Set its *force-quirks flag* to *on*. Emit the token. Reconsume the EOF character.

↪ **Anything else**
Create a new DOCTYPE token. Set the token's name to the current input character. Switch to the DOCTYPE name state.

8.2.4.54 DOCTYPE name state

Consume the next input character:

- **"tab" (U+0009)**
- **"LF" (U+000A)**
- **"FF" (U+000C)**
- **U+0020 SPACE**
  Switch to the after DOCTYPE name state.
- **">" (U+003E)**
  Switch to the data state. Emit the current DOCTYPE token.
- **Uppercase ASCII letter**
  Append the lowercase version of the current input character (add 0x0020 to the character's code point) to the current DOCTYPE token's name.
- **U+0000 NULL**
  Parse error. Append a U+FFFD REPLACEMENT CHARACTER character to the current DOCTYPE token's name.
- **EOF**
  Parse error. Switch to the data state. Set the DOCTYPE token's *force-quirks flag* to *on*. Emit that DOCTYPE token. Reconsume the EOF character.
- **Anything else**
  Append the current input character to the current DOCTYPE token's name.

8.2.4.55 After DOCTYPE name state

Consume the next input character:

- **"tab" (U+0009)**
- **"LF" (U+000A)**
- **"FF" (U+000C)**
- **U+0020 SPACE**
  Ignore the character.
- **">" (U+003E)**
  Switch to the data state. Emit the current DOCTYPE token.
- **EOF**
  Parse error. Switch to the data state. Set the DOCTYPE token's *force-quirks flag* to *on*. Emit that DOCTYPE token. Reconsume the EOF character.
- **Anything else**
  If the six characters starting from the current input character are an ASCII case-insensitive match for the word "PUBLIC", then consume those characters and switch to the after DOCTYPE public keyword state.

  Otherwise, if the six characters starting from the current input character are an ASCII case-insensitive match for the word "SYSTEM", then consume those characters and switch to the after DOCTYPE system keyword state.

  Otherwise, this is a parse error. Set the DOCTYPE token's *force-quirks flag* to *on*. Switch to the bogus DOCTYPE state.

8.2.4.56 After DOCTYPE public keyword state

Consume the next input character:

- **"tab" (U+0009)**
- **"LF" (U+000A)**
- **"FF" (U+000C)**
- **U+0020 SPACE**
  Switch to the before DOCTYPE public identifier state.

↪ **U+0022 QUOTATION MARK (")**
Parse error. Set the DOCTYPE token's public identifier to the empty string (not missing), then switch to the DOCTYPE public identifier (double-quoted) state.

↪ **"'" (U+0027)**
Parse error. Set the DOCTYPE token's public identifier to the empty string (not missing), then switch to the DOCTYPE public identifier (single-quoted) state.

↪ **">" (U+003E)**
Parse error. Set the DOCTYPE token's *force-quirks flag* to *on*. Switch to the data state. Emit that DOCTYPE token.

↪ **EOF**
Parse error. Switch to the data state. Set the DOCTYPE token's *force-quirks flag* to *on*. Emit that DOCTYPE token. Reconsume the EOF character.

↪ **Anything else**
Parse error. Set the DOCTYPE token's *force-quirks flag* to *on*. Switch to the bogus DOCTYPE state.

8.2.4.57 Before DOCTYPE public identifier state

Consume the next input character:

↪ **"tab" (U+0009)**
↪ **"LF" (U+000A)**
↪ **"FF" (U+000C)**
↪ **U+0020 SPACE**
Ignore the character.

↪ **U+0022 QUOTATION MARK (")**
Set the DOCTYPE token's public identifier to the empty string (not missing), then switch to the DOCTYPE public identifier (double-quoted) state.

↪ **"'" (U+0027)**
Set the DOCTYPE token's public identifier to the empty string (not missing), then switch to the DOCTYPE public identifier (single-quoted) state.

↪ **">" (U+003E)**
Parse error. Set the DOCTYPE token's *force-quirks flag* to *on*. Switch to the data state. Emit that DOCTYPE token.

↪ **EOF**
Parse error. Switch to the data state. Set the DOCTYPE token's *force-quirks flag* to *on*. Emit that DOCTYPE token. Reconsume the EOF character.

↪ **Anything else**
Parse error. Set the DOCTYPE token's *force-quirks flag* to *on*. Switch to the bogus DOCTYPE state.

8.2.4.58 DOCTYPE public identifier (double-quoted) state

Consume the next input character:

↪ **U+0022 QUOTATION MARK (")**
Switch to the after DOCTYPE public identifier state.

↪ **U+0000 NULL**
Parse error. Append a U+FFFD REPLACEMENT CHARACTER character to the current DOCTYPE token's public identifier.

↪ **">" (U+003E)**
Parse error. Set the DOCTYPE token's *force-quirks flag* to *on*. Switch to the data state. Emit that DOCTYPE token.

↪ **EOF**

Parse error. Switch to the data state. Set the DOCTYPE token's *force-quirks flag* to *on*. Emit that DOCTYPE token. Reconsume the EOF character.

↪ **Anything else**
Append the current input character to the current DOCTYPE token's public identifier.

8.2.4.59 DOCTYPE public identifier (single-quoted) state

Consume the next input character:

↪ **"'" (U+0027)**
Switch to the after DOCTYPE public identifier state.

↪ **U+0000 NULL**
Parse error. Append a U+FFFD REPLACEMENT CHARACTER character to the current DOCTYPE token's public identifier.

↪ **">" (U+003E)**
Parse error. Set the DOCTYPE token's *force-quirks flag* to *on*. Switch to the data state. Emit that DOCTYPE token.

↪ **EOF**
Parse error. Switch to the data state. Set the DOCTYPE token's *force-quirks flag* to *on*. Emit that DOCTYPE token. Reconsume the EOF character.

↪ **Anything else**
Append the current input character to the current DOCTYPE token's public identifier.

8.2.4.60 After DOCTYPE public identifier state

Consume the next input character:

↪ **"tab" (U+0009)**
↪ **"LF" (U+000A)**
↪ **"FF" (U+000C)**
↪ **U+0020 SPACE**
Switch to the between DOCTYPE public and system identifiers state.

↪ **">" (U+003E)**
Switch to the data state. Emit the current DOCTYPE token.

↪ **U+0022 QUOTATION MARK (")**
Parse error. Set the DOCTYPE token's system identifier to the empty string (not missing), then switch to the DOCTYPE system identifier (double-quoted) state.

↪ **"'" (U+0027)**
Parse error. Set the DOCTYPE token's system identifier to the empty string (not missing), then switch to the DOCTYPE system identifier (single-quoted) state.

↪ **EOF**
Parse error. Switch to the data state. Set the DOCTYPE token's *force-quirks flag* to *on*. Emit that DOCTYPE token. Reconsume the EOF character.

↪ **Anything else**
Parse error. Set the DOCTYPE token's *force-quirks flag* to *on*. Switch to the bogus DOCTYPE state.

8.2.4.61 Between DOCTYPE public and system identifiers state

Consume the next input character:

↪ **"tab" (U+0009)**
↪ **"LF" (U+000A)**

- **"FF" (U+000C)**
- **U+0020 SPACE**

  Ignore the character.
- **">" (U+003E)**

  Switch to the data state. Emit the current DOCTYPE token.
- **U+0022 QUOTATION MARK (")**

  Set the DOCTYPE token's system identifier to the empty string (not missing), then switch to the DOCTYPE system identifier (double-quoted) state.
- **"'" (U+0027)**

  Set the DOCTYPE token's system identifier to the empty string (not missing), then switch to the DOCTYPE system identifier (single-quoted) state.
- **EOF**

  Parse error. Switch to the data state. Set the DOCTYPE token's *force-quirks flag* to *on*. Emit that DOCTYPE token. Reconsume the EOF character.
- **Anything else**

  Parse error. Set the DOCTYPE token's *force-quirks flag* to *on*. Switch to the bogus DOCTYPE state.

8.2.4.62 After DOCTYPE system keyword state

Consume the next input character:

- **"tab" (U+0009)**
- **"LF" (U+000A)**
- **"FF" (U+000C)**
- **U+0020 SPACE**

  Switch to the before DOCTYPE system identifier state.
- **U+0022 QUOTATION MARK (")**

  Parse error. Set the DOCTYPE token's system identifier to the empty string (not missing), then switch to the DOCTYPE system identifier (double-quoted) state.
- **"'" (U+0027)**

  Parse error. Set the DOCTYPE token's system identifier to the empty string (not missing), then switch to the DOCTYPE system identifier (single-quoted) state.
- **">" (U+003E)**

  Parse error. Set the DOCTYPE token's *force-quirks flag* to *on*. Switch to the data state. Emit that DOCTYPE token.
- **EOF**

  Parse error. Switch to the data state. Set the DOCTYPE token's *force-quirks flag* to *on*. Emit that DOCTYPE token. Reconsume the EOF character.
- **Anything else**

  Parse error. Set the DOCTYPE token's *force-quirks flag* to *on*. Switch to the bogus DOCTYPE state.

8.2.4.63 Before DOCTYPE system identifier state

Consume the next input character:

- **"tab" (U+0009)**
- **"LF" (U+000A)**
- **"FF" (U+000C)**
- **U+0020 SPACE**

  Ignore the character.
- **U+0022 QUOTATION MARK (")**

  Set the DOCTYPE token's system identifier to the empty string (not missing), then

switch to the DOCTYPE system identifier (double-quoted) state.

↪ **"'" (U+0027)**
Set the DOCTYPE token's system identifier to the empty string (not missing), then switch to the DOCTYPE system identifier (single-quoted) state.

↪ **">" (U+003E)**
Parse error. Set the DOCTYPE token's *force-quirks flag* to *on*. Switch to the data state. Emit that DOCTYPE token.

↪ **EOF**
Parse error. Switch to the data state. Set the DOCTYPE token's *force-quirks flag* to *on*. Emit that DOCTYPE token. Reconsume the EOF character.

↪ **Anything else**
Parse error. Set the DOCTYPE token's *force-quirks flag* to *on*. Switch to the bogus DOCTYPE state.

8.2.4.64 DOCTYPE system identifier (double-quoted) state

Consume the next input character:

↪ **U+0022 QUOTATION MARK (")**
Switch to the after DOCTYPE system identifier state.

↪ **U+0000 NULL**
Parse error. Append a U+FFFD REPLACEMENT CHARACTER character to the current DOCTYPE token's system identifier.

↪ **">" (U+003E)**
Parse error. Set the DOCTYPE token's *force-quirks flag* to *on*. Switch to the data state. Emit that DOCTYPE token.

↪ **EOF**
Parse error. Switch to the data state. Set the DOCTYPE token's *force-quirks flag* to *on*. Emit that DOCTYPE token. Reconsume the EOF character.

↪ **Anything else**
Append the current input character to the current DOCTYPE token's system identifier.

8.2.4.65 DOCTYPE system identifier (single-quoted) state

Consume the next input character:

↪ **"'" (U+0027)**
Switch to the after DOCTYPE system identifier state.

↪ **U+0000 NULL**
Parse error. Append a U+FFFD REPLACEMENT CHARACTER character to the current DOCTYPE token's system identifier.

↪ **">" (U+003E)**
Parse error. Set the DOCTYPE token's *force-quirks flag* to *on*. Switch to the data state. Emit that DOCTYPE token.

↪ **EOF**
Parse error. Switch to the data state. Set the DOCTYPE token's *force-quirks flag* to *on*. Emit that DOCTYPE token. Reconsume the EOF character.

↪ **Anything else**
Append the current input character to the current DOCTYPE token's system identifier.

8.2.4.66 After DOCTYPE system identifier state

Consume the next input character:

- **"tab" (U+0009)**
- **"LF" (U+000A)**
- **"FF" (U+000C)**
- **U+0020 SPACE**

  Ignore the character.
- **">" (U+003E)**

  Switch to the data state. Emit the current DOCTYPE token.
- **EOF**

  Parse error. Switch to the data state. Set the DOCTYPE token's *force-quirks flag* to *on*. Emit that DOCTYPE token. Reconsume the EOF character.
- **Anything else**

  Parse error. Switch to the bogus DOCTYPE state. (This does *not* set the DOCTYPE token's *force-quirks flag* to *on*.)

8.2.4.67 Bogus DOCTYPE state

Consume the next input character:

- **">" (U+003E)**

  Switch to the data state. Emit the DOCTYPE token.
- **EOF**

  Switch to the data state. Emit the DOCTYPE token. Reconsume the EOF character.
- **Anything else**

  Ignore the character.

8.2.4.68 CDATA section state

Switch to the data state.

Consume every character up to the next occurrence of the three character sequence U+005D RIGHT SQUARE BRACKET U+005D RIGHT SQUARE BRACKET U+003E GREATER-THAN SIGN (`]]>`), or the end of the file (EOF), whichever comes first. Emit a series of character tokens consisting of all the characters consumed except the matching three character sequence at the end (if one was found before the end of the file).

If the end of the file was reached, reconsume the EOF character.

8.2.4.69 Tokenizing character references

This section defines how to **consume a character reference**, optionally with an **additional allowed character**, which, if specified where the algorithm is invoked, adds a character to the list of characters that cause there to not be a character reference.

This definition is used when parsing character references in text and in attributes.

The behavior depends on the identity of the next character (the one immediately after the U+0026 AMPERSAND character), as follows:

- **"tab" (U+0009)**
- **"LF" (U+000A)**
- **"FF" (U+000C)**
- **U+0020 SPACE**
- **U+003C LESS-THAN SIGN**

- **U+0026 AMPERSAND**
- **EOF**
- **The additional allowed character, if there is one**
  Not a character reference. No characters are consumed, and nothing is returned. (This is not an error, either.)
- **"#" (U+0023)**
  Consume the U+0023 NUMBER SIGN.

  The behavior further depends on the character after the U+0023 NUMBER SIGN:

  - **U+0078 LATIN SMALL LETTER X**
  - **U+0058 LATIN CAPITAL LETTER X**
    Consume the X.

    Follow the steps below, but using ASCII hex digits.

    When it comes to interpreting the number, interpret it as a hexadecimal number.

  - **Anything else**
    Follow the steps below, but using ASCII digits.

    When it comes to interpreting the number, interpret it as a decimal number.

  Consume as many characters as match the range of characters given above (ASCII hex digits or ASCII digits).

  If no characters match the range, then don't consume any characters (and unconsume the U+0023 NUMBER SIGN character and, if appropriate, the X character). This is a parse error; nothing is returned.

  Otherwise, if the next character is a U+003B SEMICOLON, consume that too. If it isn't, there is a parse error.

  If one or more characters match the range, then take them all and interpret the string of characters as a number (either hexadecimal or decimal as appropriate).

  If that number is one of the numbers in the first column of the following table, then this is a parse error. Find the row with that number in the first column, and return a character token for the Unicode character given in the second column of that row.

Number	Unicode character	
0x00	U+FFFD	REPLACEMENT CHARACTER
0x80	U+20AC	EURO SIGN (€)
0x82	U+201A	SINGLE LOW-9 QUOTATION MARK (‚)
0x83	U+0192	LATIN SMALL LETTER F WITH HOOK (ƒ)
0x84	U+201E	DOUBLE LOW-9 QUOTATION MARK („)
0x85	U+2026	HORIZONTAL ELLIPSIS (…)
0x86	U+2020	DAGGER (†)
0x87	U+2021	DOUBLE DAGGER (‡)
0x88	U+02C6	MODIFIER LETTER CIRCUMFLEX ACCENT (ˆ)
0x89	U+2030	PER MILLE SIGN (‰)

0x8A	U+0160	LATIN CAPITAL LETTER S WITH CARON (Š)
0x8B	U+2039	SINGLE LEFT-POINTING ANGLE QUOTATION MARK (‹)
0x8C	U+0152	LATIN CAPITAL LIGATURE OE (Œ)
0x8E	U+017D	LATIN CAPITAL LETTER Z WITH CARON (Ž)
0x91	U+2018	LEFT SINGLE QUOTATION MARK (‘)
0x92	U+2019	RIGHT SINGLE QUOTATION MARK (’)
0x93	U+201C	LEFT DOUBLE QUOTATION MARK (“)
0x94	U+201D	RIGHT DOUBLE QUOTATION MARK (”)
0x95	U+2022	BULLET (•)
0x96	U+2013	EN DASH (–)
0x97	U+2014	EM DASH (—)
0x98	U+02DC	SMALL TILDE (˜)
0x99	U+2122	TRADE MARK SIGN (™)
0x9A	U+0161	LATIN SMALL LETTER S WITH CARON (š)
0x9B	U+203A	SINGLE RIGHT-POINTING ANGLE QUOTATION MARK (›)
0x9C	U+0153	LATIN SMALL LIGATURE OE (œ)
0x9E	U+017E	LATIN SMALL LETTER Z WITH CARON (ž)
0x9F	U+0178	LATIN CAPITAL LETTER Y WITH DIAERESIS (Ÿ)

Otherwise, if the number is in the range 0xD800 to 0xDFFF or is greater than 0x10FFFF, then this is a parse error. Return a U+FFFD REPLACEMENT CHARACTER character token.

Otherwise, return a character token for the Unicode character whose code point is that number. Additionally, if the number is in the range 0x0001 to 0x0008, 0x000D to 0x001F, 0x007F to 0x009F, 0xFDD0 to 0xFDEF, or is one of 0x000B, 0xFFFE, 0xFFFF, 0x1FFFE, 0x1FFFF, 0x2FFFE, 0x2FFFF, 0x3FFFE, 0x3FFFF, 0x4FFFE, 0x4FFFF, 0x5FFFE, 0x5FFFF, 0x6FFFE, 0x6FFFF, 0x7FFFE, 0x7FFFF, 0x8FFFE, 0x8FFFF, 0x9FFFE, 0x9FFFF, 0xAFFFE, 0xAFFFF, 0xBFFFE, 0xBFFFF, 0xCFFFE, 0xCFFFF, 0xDFFFE, 0xDFFFF, 0xEFFFE, 0xEFFFF, 0xFFFFE, 0xFFFFF, 0x10FFFE, or 0x10FFFF, then this is a parse error.

↪ **Anything else**

Consume the maximum number of characters possible, with the consumed characters matching one of the identifiers in the first column of the named character references table (in a case-sensitive manner).

If no match can be made, then no characters are consumed, and nothing is returned. In this case, if the characters after the U+0026 AMPERSAND character (&) consist of a sequence of one or more alphanumeric ASCII characters followed by a U+003B SEMICOLON character (;), then this is a parse error.

If the character reference is being consumed as part of an attribute, and the last character matched is not a ";" (U+003B) character, and the next character is either a "=" (U+003D) character or an alphanumeric ASCII character, then, for historical reasons, all the characters that were matched after the U+0026 AMPERSAND character (&) must be unconsumed, and nothing is returned. However, if this next character is in fact a "=" (U+003D) character, then this is a parse error, because some legacy user agents will misinterpret the markup in those cases.

Otherwise, a character reference is parsed. If the last character matched is not a ";" (U+003B) character, there is a parse error.

Return one or two character tokens for the character(s) corresponding to the character reference name (as given by the second column of the named character references table).

> **Code Example:**
> If the markup contains (not in an attribute) the string `I'm &notit; I tell you`, the character reference is parsed as "not", as in, `I'm ¬it; I tell you` (and this is a parse error). But if the markup was `I'm &notin; I tell you`, the character reference would be parsed as "notin;", resulting in `I'm ∉ I tell you` (and no parse error).

8.2.5 Tree construction

The input to the tree construction stage is a sequence of tokens from the tokenization stage. The tree construction stage is associated with a DOM `Document` object when a parser is created. The "output" of this stage consists of dynamically modifying or extending that document's DOM tree.

This specification does not define when an interactive user agent has to render the `Document` so that it is available to the user, or when it has to begin accepting user input.

As each token is emitted from the tokenizer, the user agent must follow the appropriate steps from the following list, known as the **tree construction dispatcher**:

- **If there is no adjusted current node**
- **If the adjusted current node is an element in the HTML namespace**
- **If the adjusted current node is a MathML text integration point and the token is a start tag whose tag name is neither "mglyph" nor "malignmark"**
- **If the adjusted current node is a MathML text integration point and the token is a character token**
- **If the adjusted current node is an `annotation-xml` element in the MathML namespace and the token is a start tag whose tag name is "svg"**
- **If the adjusted current node is an HTML integration point and the token is a start tag**
- **If the adjusted current node is an HTML integration point and the token is a character token**
- **If the token is an end-of-file token**
  Process the token according to the rules given in the section corresponding to the current insertion mode in HTML content.
- **Otherwise**
  Process the token according to the rules given in the section for parsing tokens in foreign content.

The **next token** is the token that is about to be processed by the tree construction dispatcher (even if the token is subsequently just ignored).

A node is a **MathML text integration point** if it is one of the following elements:

- An `mi` element in the MathML namespace
- An `mo` element in the MathML namespace
- An `mn` element in the MathML namespace
- An `ms` element in the MathML namespace
- An `mtext` element in the MathML namespace

A node is an **HTML integration point** if it is one of the following elements:

- An `annotation-xml` element in the MathML namespace whose start tag token had an attribute with the name "encoding" whose value was an ASCII case-insensitive match for the string "`text/html`"
- An `annotation-xml` element in the MathML namespace whose start tag token had an attribute with the name "encoding" whose value was an ASCII case-insensitive match for the string "`application/xhtml+xml`"
- A `foreignObject` element in the SVG namespace
- A `desc` element in the SVG namespace
- A `title` element in the SVG namespace

> **Note:** Not all of the tag names mentioned below are conformant tag names in this specification; many are included to handle legacy content. They still form part of the algorithm that implementations are required to implement to claim conformance.

> **Note:** The algorithm described below places no limit on the depth of the DOM tree generated, or on the length of tag names, attribute names, attribute values, `Text` nodes, etc. While implementors are encouraged to avoid arbitrary limits, it is recognized that practical concerns will likely force user agents to impose nesting depth constraints.

8.2.5.1 Creating and inserting nodes

While the parser is processing a token, it can enable or disable **foster parenting**. This affects the following algorithm.

The **appropriate place for inserting a node**, optionally using a particular *override target*, is the position in an element returned by running the following steps:

1. If there was an *override target* specified, then let *target* be the *override target*.

   Otherwise, let *target* be the current node.

2. Determine the *adjusted insertion location* using the first matching steps from the following list:

   ↪ **If foster parenting is enabled and *target* is a `table`, `tbody`, `tfoot`, `thead`, or `tr` element**

   > **Note:** Foster parenting happens when content is misnested in tables.

   Run these substeps:

   1. Let *last template* be the last `template` element in the stack of open elements, if any.

   2. Let *last table* be the last `table` element in the stack of open elements, if any.

   3. If there is a *last template* and either there is no *last table*, or there is one, but *last template* is lower (more recently added) than *last table* in the stack of open elements, then: let *adjusted insertion location* be inside *last template*'s template contents, after its last child (if any), and abort these substeps.

4. If there is no *last table*, then let *adjusted insertion location* be inside the first element in the stack of open elements (the `html` element), after its last child (if any), and abort these substeps. (fragment case)

5. If *last table* has a parent element, then let *adjusted insertion location* be inside *last table*'s parent element, immediately before *last table*, and abort these substeps.

6. Let *previous element* be the element immediately above *last table* in the stack of open elements.

7. Let *adjusted insertion location* be inside *previous element*, after its last child (if any).

> **Note:** These steps are involved in part because it's possible for elements, the `table` element in this case in particular, to have been moved by a script around in the DOM, or indeed removed from the DOM entirely, after the element was inserted by the parser.

↳ **Otherwise**

Let *adjusted insertion location* be inside *target*, after its last child (if any).

3. If the *adjusted insertion location* is inside a `template` element, let it instead be inside the `template` element's template contents, after its last child (if any).

4. Return the *adjusted insertion location*.

When the steps below require the UA to **create an element for a token** in a particular *given namespace* and with a particular *intended parent*, the UA must run the following steps:

1. Create a node implementing the interface appropriate for the element type corresponding to the tag name of the token in *given namespace* (as given in the specification that defines that element, e.g. for an `a` element in the HTML namespace, this specification defines it to be the `HTMLAnchorElement` interface), with the tag name being the name of that element, with the node being in the given namespace, and with the attributes on the node being those given in the given token.

   The interface appropriate for an element in the HTML namespace that is not defined in this specification (or other applicable specifications) is `HTMLUnknownElement`. Elements in other namespaces whose interface is not defined by that namespace's specification must use the interface `Element`.

   The `ownerDocument` of the newly created element must be the same as that of the *intended parent*.

2. If the newly created element has an `xmlns` attribute *in the XMLNS namespace* whose value is not exactly the same as the element's namespace, that is a parse error. Similarly, if the newly created element has an `xmlns:xlink` attribute in the XMLNS namespace whose value is not the XLink Namespace, that is a parse error.

3. If the newly created element is a resettable element, invoke its reset algorithm. (This initializes the element's value and checkedness based on the element's attributes.)

4. If the element is a form-associated element, and the `form` element pointer is not null, and there is no `template` element on the stack of open elements, and the newly created

element is either not reassociateable or doesn't have a `form` attribute, and the *intended parent* is in the same home subtree as the element pointed to by the `form` element pointer, associate the newly created element with the `form` element pointed to by the `form` element pointer, and suppress the running of the reset the form owner algorithm when the parser subsequently attempts to insert the element.

5. Return the newly created element.

When the steps below require the user agent to **insert a foreign element** for a token in a given namespace, the user agent must run these steps:

1. Let the *adjusted insertion location* be the appropriate place for inserting a node.
2. Create an element for the token in the given namespace, with the intended parent being the element in which the *adjusted insertion location* finds itself.
3. If it is possible to insert an element at the *adjusted insertion location*, then insert the newly created element at the *adjusted insertion location*.

> **Note:** If the *adjusted insertion location* cannot accept more elements, e.g. because it's a `Document` that already has an element child, then the newly created element is dropped on the floor.

4. Push the element onto the stack of open elements so that it is the new current node.
5. Return the newly created element.

When the steps below require the user agent to **insert an HTML element** for a token, the user agent must insert a foreign element for the token, in the HTML namespace.

When the steps below require the user agent to **adjust MathML attributes** for a token, then, if the token has an attribute named `definitionurl`, change its name to `definitionURL` (note the case difference).

When the steps below require the user agent to **adjust SVG attributes** for a token, then, for each attribute on the token whose attribute name is one of the ones in the first column of the following table, change the attribute's name to the name given in the corresponding cell in the second column. (This fixes the case of SVG attributes that are not all lowercase.)

Attribute name on token	Attribute name on element
`attributename`	`attributeName`
`attributetype`	`attributeType`
`basefrequency`	`baseFrequency`
`baseprofile`	`baseProfile`
`calcmode`	`calcMode`
`clippathunits`	`clipPathUnits`
`contentscripttype`	`contentScriptType`
`contentstyletype`	`contentStyleType`
`diffuseconstant`	`diffuseConstant`
`edgemode`	`edgeMode`

externalresourcesrequired	externalResourcesRequired
filterres	filterRes
filterunits	filterUnits
glyphref	glyphRef
gradienttransform	gradientTransform
gradientunits	gradientUnits
kernelmatrix	kernelMatrix
kernelunitlength	kernelUnitLength
keypoints	keyPoints
keysplines	keySplines
keytimes	keyTimes
lengthadjust	lengthAdjust
limitingconeangle	limitingConeAngle
markerheight	markerHeight
markerunits	markerUnits
markerwidth	markerWidth
maskcontentunits	maskContentUnits
maskunits	maskUnits
numoctaves	numOctaves
pathlength	pathLength
patterncontentunits	patternContentUnits
patterntransform	patternTransform
patternunits	patternUnits
pointsatx	pointsAtX
pointsaty	pointsAtY
pointsatz	pointsAtZ
preservealpha	preserveAlpha
preserveaspectratio	preserveAspectRatio
primitiveunits	primitiveUnits
refx	refX
refy	refY
repeatcount	repeatCount
repeatdur	repeatDur
requiredextensions	requiredExtensions
requiredfeatures	requiredFeatures
specularconstant	specularConstant
specularexponent	specularExponent
spreadmethod	spreadMethod
startoffset	startOffset
stddeviation	stdDeviation

stitchtiles	stitchTiles
surfacescale	surfaceScale
systemlanguage	systemLanguage
tablevalues	tableValues
targetx	targetX
targety	targetY
textlength	textLength
viewbox	viewBox
viewtarget	viewTarget
xchannelselector	xChannelSelector
ychannelselector	yChannelSelector
zoomandpan	zoomAndPan

When the steps below require the user agent to **adjust foreign attributes** for a token, then, if any of the attributes on the token match the strings given in the first column of the following table, let the attribute be a namespaced attribute, with the prefix being the string given in the corresponding cell in the second column, the local name being the string given in the corresponding cell in the third column, and the namespace being the namespace given in the corresponding cell in the fourth column. (This fixes the use of namespaced attributes, in particular `lang` attributes in the XML namespace.)

Attribute name	Prefix	Local name	Namespace
xlink:actuate	xlink	actuate	XLink namespace
xlink:arcrole	xlink	arcrole	XLink namespace
xlink:href	xlink	href	XLink namespace
xlink:role	xlink	role	XLink namespace
xlink:show	xlink	show	XLink namespace
xlink:title	xlink	title	XLink namespace
xlink:type	xlink	type	XLink namespace
xml:base	xml	base	XML namespace
xml:lang	xml	lang	XML namespace
xml:space	xml	space	XML namespace
xmlns	(none)	xmlns	XMLNS namespace
xmlns:xlink	xmlns	xlink	XMLNS namespace

When the steps below require the user agent to **insert a character** while processing a token, the user agent must run the following steps:

1. Let *data* be the characters passed to the algorithm, or, if no characters were explicitly specified, the character of the character token being processed.
2. Let the *adjusted insertion location* be the appropriate place for inserting a node.
3. If the *adjusted insertion location* is in a `Document` node, then abort these steps.

> **Note:** The DOM will not let `Document` nodes have `Text` node children, so they are dropped on the floor.

4. If there is a `Text` node immediately before the *adjusted insertion location*, then append *data* to that `Text` node's data.

   Otherwise, create a new `Text` node whose data is *data* and whose `ownerDocument` is the same as that of the element in which the *adjusted insertion location* finds itself, and insert the newly created node at the *adjusted insertion location*.

Code Example:

Here are some sample inputs to the parser and the corresponding number of `Text` nodes that they result in, assuming a user agent that executes scripts.

Input	Number of `Text` nodes

`A<script>`
`var script = document.getElementsByTagName('script')`
`[0];`
`document.body.removeChild(script);`
`</script>B`
	One `Text` node in the document, containing "AB".

`A<script>`
`var text = document.createTextNode('B');`
`document.body.appendChild(text);`
`</script>C`
	Three `Text` nodes; "A" before the script, the script's contents, and "BC" after the script (the parser appends to the `Text` node created by the script).

`A<script>`
`var text = document.getElementsByTagName('script')`
`[0].firstChild;`
`text.data = 'B';`
`document.body.appendChild(text);`
`</script>C`
	Two adjacent `Text` nodes in the document, containing "A" and "BC".

`A<table>B<tr>C</tr>D</table>`	One `Text` node before the table, containing "ABCD". (This is caused by foster parenting.)
`A<table><tr> B</tr> C</table>`	One `Text` node before the table, containing "A B C" (A-space-B-space-C). (This is caused by foster parenting.)
`A<table><tr> B</tr> </em>C</table>`	One `Text` node before the table, containing "A BC" (A-space-B-C), and one `Text` node inside the table (as a child of a `tbody`) with a single space character. (Space characters separated from non-space characters by non-character tokens are not

	affected by foster parenting, even if those other tokens then get ignored.)

When the steps below require the user agent to **insert a comment** while processing a comment token, optionally with an explicitly insertion position *position*, the user agent must run the following steps:

1. Let *data* be the data given in the comment token being processed.
2. If *position* was specified, then let the *adjusted insertion location* be *position*. Otherwise, let *adjusted insertion location* be the appropriate place for inserting a node.
3. Create a `Comment` node whose `data` attribute is set to *data* and whose `ownerDocument` is the same as that of the node in which the *adjusted insertion location* finds itself.
4. Insert the newly created node at the *adjusted insertion location*.

DOM mutation events must not fire for changes caused by the UA parsing the document. This includes the parsing of any content inserted using `document.write()` and `document.writeln()` calls. [DOMEVENTS]

However, mutation observers *do* fire, as required by the DOM specification.

8.2.5.2 Parsing elements that contain only text

The **generic raw text element parsing algorithm** and the **generic RCDATA element parsing algorithm** consist of the following steps. These algorithms are always invoked in response to a start tag token.

1. Insert an HTML element for the token.
2. If the algorithm that was invoked is the generic raw text element parsing algorithm, switch the tokenizer to the RAWTEXT state; otherwise the algorithm invoked was the generic RCDATA element parsing algorithm, switch the tokenizer to the RCDATA state.
3. Let the original insertion mode be the current insertion mode.
4. Then, switch the insertion mode to "text".

8.2.5.3 Closing elements that have implied end tags

When the steps below require the UA to **generate implied end tags**, then, while the current node is a `dd` element, a `dt` element, an `li` element, an `option` element, an `optgroup` element, a `p` element, an `rb` element, an `rp` element, an `rt` element, or an `rtc` element, the UA must pop the current node off the stack of open elements.

If a step requires the UA to generate implied end tags but lists an element to exclude from the process, then the UA must perform the above steps as if that element was not in the above list.

8.2.5.4 The rules for parsing tokens in HTML content

8.2.5.4.1 The "initial" insertion mode

When the user agent is to apply the rules for the "initial" insertion mode, the user agent must handle the token as follows:

↪ **A character token that is one of U+0009 CHARACTER TABULATION, "LF" (U+000A), "FF" (U+000C), "CR" (U+000D), or U+0020 SPACE**
Ignore the token.

↪ **A comment token**
Insert a comment as the last child of the `Document` object.

↪ **A DOCTYPE token**
If the DOCTYPE token's name is not a case-sensitive match for the string "`html`", or the token's public identifier is not missing, or the token's system identifier is neither missing nor a case-sensitive match for the string "`about:legacy-compat`", and none of the sets of conditions in the following list are matched, then there is a parse error.

- The DOCTYPE token's name is a case-sensitive match for the string "`html`", the token's public identifier is the case-sensitive string "`-//W3C//DTD HTML 4.0//EN`", and the token's system identifier is either missing or the case-sensitive string "`http://www.w3.org/TR/REC-html40/strict.dtd`".
- The DOCTYPE token's name is a case-sensitive match for the string "`html`", the token's public identifier is the case-sensitive string "`-//W3C//DTD HTML 4.01//EN`", and the token's system identifier is either missing or the case-sensitive string "`http://www.w3.org/TR/html4/strict.dtd`".
- The DOCTYPE token's name is a case-sensitive match for the string "`html`", the token's public identifier is the case-sensitive string "`-//W3C//DTD XHTML 1.0 Strict//EN`", and the token's system identifier is the case-sensitive string "`http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd`".
- The DOCTYPE token's name is a case-sensitive match for the string "`html`", the token's public identifier is the case-sensitive string "`-//W3C//DTD XHTML 1.1//EN`", and the token's system identifier is the case-sensitive string "`http://www.w3.org/TR/xhtml11/DTD/xhtml11.dtd`".

Conformance checkers may, based on the values (including presence or lack thereof) of the DOCTYPE token's name, public identifier, or system identifier, switch to a conformance checking mode for another language (e.g. based on the DOCTYPE token a conformance checker could recognize that the document is an HTML4-era document, and defer to an HTML4 conformance checker.)

Append a `DocumentType` node to the `Document` node, with the `name` attribute set to the name given in the DOCTYPE token, or the empty string if the name was missing; the `publicId` attribute set to the public identifier given in the DOCTYPE token, or the empty string if the public identifier was missing; the `systemId` attribute set to the system identifier given in the DOCTYPE token, or the empty string if the system identifier was missing; and the other attributes specific to `DocumentType` objects set to null and empty lists as appropriate. Associate the `DocumentType` node with the `Document` object so that it is returned as the value of the `doctype` attribute of the `Document` object.

Then, if the document is *not* an `iframe srcdoc` document, and the DOCTYPE token

matches one of the conditions in the following list, then set the `Document` to quirks mode:

- The *force-quirks flag* is set to *on*.
- The name is set to anything other than "`html`" (compared case-sensitively).
- The public identifier starts with: "`+//Silmaril//dtd html Pro v0r11 19970101//`"
- The public identifier starts with: "`-//AdvaSoft Ltd//DTD HTML 3.0 asWedit + extensions//`"
- The public identifier starts with: "`-//AS//DTD HTML 3.0 asWedit + extensions//`"
- The public identifier starts with: "`-//IETF//DTD HTML 2.0 Level 1//`"
- The public identifier starts with: "`-//IETF//DTD HTML 2.0 Level 2//`"
- The public identifier starts with: "`-//IETF//DTD HTML 2.0 Strict Level 1//`"
- The public identifier starts with: "`-//IETF//DTD HTML 2.0 Strict Level 2//`"
- The public identifier starts with: "`-//IETF//DTD HTML 2.0 Strict//`"
- The public identifier starts with: "`-//IETF//DTD HTML 2.0//`"
- The public identifier starts with: "`-//IETF//DTD HTML 2.1E//`"
- The public identifier starts with: "`-//IETF//DTD HTML 3.0//`"
- The public identifier starts with: "`-//IETF//DTD HTML 3.2 Final//`"
- The public identifier starts with: "`-//IETF//DTD HTML 3.2//`"
- The public identifier starts with: "`-//IETF//DTD HTML 3//`"
- The public identifier starts with: "`-//IETF//DTD HTML Level 0//`"
- The public identifier starts with: "`-//IETF//DTD HTML Level 1//`"
- The public identifier starts with: "`-//IETF//DTD HTML Level 2//`"
- The public identifier starts with: "`-//IETF//DTD HTML Level 3//`"
- The public identifier starts with: "`-//IETF//DTD HTML Strict Level 0//`"
- The public identifier starts with: "`-//IETF//DTD HTML Strict Level 1//`"
- The public identifier starts with: "`-//IETF//DTD HTML Strict Level 2//`"
- The public identifier starts with: "`-//IETF//DTD HTML Strict Level 3//`"
- The public identifier starts with: "`-//IETF//DTD HTML Strict//`"
- The public identifier starts with: "`-//IETF//DTD HTML//`"
- The public identifier starts with: "`-//Metrius//DTD Metrius Presentational//`"
- The public identifier starts with: "`-//Microsoft//DTD Internet Explorer 2.0 HTML Strict//`"
- The public identifier starts with: "`-//Microsoft//DTD Internet Explorer 2.0 HTML//`"
- The public identifier starts with: "`-//Microsoft//DTD Internet Explorer 2.0 Tables//`"
- The public identifier starts with: "`-//Microsoft//DTD Internet Explorer 3.0 HTML Strict//`"
- The public identifier starts with: "`-//Microsoft//DTD Internet Explorer 3.0 HTML//`"
- The public identifier starts with: "`-//Microsoft//DTD Internet Explorer 3.0 Tables//`"
- The public identifier starts with: "`-//Netscape Comm. Corp.//DTD HTML//`"
- The public identifier starts with: "`-//Netscape Comm. Corp.//DTD Strict HTML//`"
- The public identifier starts with: "`-//O'Reilly and Associates//DTD HTML 2.0//`"
- The public identifier starts with: "`-//O'Reilly and Associates//DTD HTML Extended 1.0//`"
- The public identifier starts with: "`-//O'Reilly and Associates//DTD HTML Extended Relaxed 1.0//`"
- The public identifier starts with: "`-//SoftQuad Software//DTD HoTMetaL PRO 6.0::19990601::extensions to HTML 4.0//`"
- The public identifier starts with: "`-//SoftQuad//DTD HoTMetaL PRO 4.0::19971010::extensions to HTML 4.0//`"
- The public identifier starts with: "`-//Spyglass//DTD HTML 2.0 Extended//`"

- The public identifier starts with: "-//SQ//DTD HTML 2.0 HoTMetaL + extensions//"
- The public identifier starts with: "-//Sun Microsystems Corp.//DTD HotJava HTML//"
- The public identifier starts with: "-//Sun Microsystems Corp.//DTD HotJava Strict HTML//"
- The public identifier starts with: "-//W3C//DTD HTML 3 1995-03-24//"
- The public identifier starts with: "-//W3C//DTD HTML 3.2 Draft//"
- The public identifier starts with: "-//W3C//DTD HTML 3.2 Final//"
- The public identifier starts with: "-//W3C//DTD HTML 3.2//"
- The public identifier starts with: "-//W3C//DTD HTML 3.2S Draft//"
- The public identifier starts with: "-//W3C//DTD HTML 4.0 Frameset//"
- The public identifier starts with: "-//W3C//DTD HTML 4.0 Transitional//"
- The public identifier starts with: "-//W3C//DTD HTML Experimental 19960712//"
- The public identifier starts with: "-//W3C//DTD HTML Experimental 970421//"
- The public identifier starts with: "-//W3C//DTD W3 HTML//"
- The public identifier starts with: "-//W3O//DTD W3 HTML 3.0//"
- The public identifier is set to: "-//W3O//DTD W3 HTML Strict 3.0//EN//"
- The public identifier starts with: "-//WebTechs//DTD Mozilla HTML 2.0//"
- The public identifier starts with: "-//WebTechs//DTD Mozilla HTML//"
- The public identifier is set to: "-/W3C/DTD HTML 4.0 Transitional/EN"
- The public identifier is set to: "HTML"
- The system identifier is set to: "http://www.ibm.com/data/dtd/v11/ibmxhtml1-transitional.dtd"
- The system identifier is missing and the public identifier starts with: "-//W3C//DTD HTML 4.01 Frameset//"
- The system identifier is missing and the public identifier starts with: "-//W3C//DTD HTML 4.01 Transitional//"

Otherwise, if the document is *not* an `iframe srcdoc` document, and the DOCTYPE token matches one of the conditions in the following list, then set the `Document` to limited-quirks mode:

- The public identifier starts with: "-//W3C//DTD XHTML 1.0 Frameset//"
- The public identifier starts with: "-//W3C//DTD XHTML 1.0 Transitional//"
- The system identifier is not missing and the public identifier starts with: "-//W3C//DTD HTML 4.01 Frameset//"
- The system identifier is not missing and the public identifier starts with: "-//W3C//DTD HTML 4.01 Transitional//"

The system identifier and public identifier strings must be compared to the values given in the lists above in an ASCII case-insensitive manner. A system identifier whose value is the empty string is not considered missing for the purposes of the conditions above.

Then, switch the insertion mode to "before html".

↪ **Anything else**

If the document is *not* an `iframe srcdoc` document, then this is a parse error; set the `Document` to quirks mode.

In any case, switch the insertion mode to "before html", then reprocess the token.

8.2.5.4.2 The "before html" insertion mode

When the user agent is to apply the rules for the "before html" insertion mode, the user agent must handle the token as follows:

↪ **A DOCTYPE token**
Parse error. Ignore the token.

↪ **A comment token**
Insert a comment as the last child of the `Document` object.

↪ **A character token that is one of U+0009 CHARACTER TABULATION, "LF" (U+000A), "FF" (U+000C), "CR" (U+000D), or U+0020 SPACE**
Ignore the token.

↪ **A start tag whose tag name is "html"**
Create an element for the token in the HTML namespace, with the `Document` as the intended parent. Append it to the `Document` object. Put this element in the stack of open elements.

If the `Document` is being loaded as part of navigation of a browsing context, then: if the newly created element has a `manifest` attribute whose value is not the empty string, then resolve the value of that attribute to an absolute URL, relative to the newly created element, and if that is successful, run the application cache selection algorithm with the result of applying the URL serializer algorithm to the resulting parsed URL with the *exclude fragment flag* set; otherwise, if there is no such attribute, or its value is the empty string, or resolving its value fails, run the application cache selection algorithm with no manifest. The algorithm must be passed the `Document` object.

Switch the insertion mode to "before head".

↪ **An end tag whose tag name is one of: "head", "body", "html", "br"**
Act as described in the "anything else" entry below.

↪ **Any other end tag**
Parse error. Ignore the token.

↪ **Anything else**
Create an `html` element whose `ownerDocument` is the `Document` object. Append it to the `Document` object. Put this element in the stack of open elements.

If the `Document` is being loaded as part of navigation of a browsing context, then: run the application cache selection algorithm with no manifest, passing it the `Document` object.

Switch the insertion mode to "before head", then reprocess the token.

The root element can end up being removed from the `Document` object, e.g. by scripts; nothing in particular happens in such cases, content continues being appended to the nodes as described in the next section.

8.2.5.4.3 The "before head" insertion mode

When the user agent is to apply the rules for the "before head" insertion mode, the user agent must handle the token as follows:

↪ **A character token that is one of U+0009 CHARACTER TABULATION, "LF" (U+000A), "FF" (U+000C), "CR" (U+000D), or U+0020 SPACE**
Ignore the token.

↪ **A comment token**
Insert a comment.

↪ **A DOCTYPE token**
Parse error. Ignore the token.

↪ **A start tag whose tag name is "html"**
Process the token using the rules for the "in body" insertion mode.

↪ **A start tag whose tag name is "head"**
Insert an HTML element for the token.

Set the `head` element pointer to the newly created `head` element.

Switch the insertion mode to "in head".

↪ **An end tag whose tag name is one of: "head", "body", "html", "br"**
Act as described in the "anything else" entry below.

↪ **Any other end tag**
Parse error. Ignore the token.

↪ **Anything else**
Insert an HTML element for a "head" start tag token with no attributes.

Set the `head` element pointer to the newly created `head` element.

Switch the insertion mode to "in head".

Reprocess the current token.

8.2.5.4.4 The "in head" insertion mode

When the user agent is to apply the rules for the "in head" insertion mode, the user agent must handle the token as follows:

↪ **A character token that is one of U+0009 CHARACTER TABULATION, "LF" (U+000A), "FF" (U+000C), "CR" (U+000D), or U+0020 SPACE**
Insert the character.

↪ **A comment token**
Insert a comment.

↪ **A DOCTYPE token**
Parse error. Ignore the token.

↪ **A start tag whose tag name is "html"**
Process the token using the rules for the "in body" insertion mode.

↪ **A start tag whose tag name is one of: "base", "basefont", "bgsound", "link"**
Insert an HTML element for the token. Immediately pop the current node off the stack of open elements.

Acknowledge the token's *self-closing flag*, if it is set.

↪ **A start tag whose tag name is "meta"**
Insert an HTML element for the token. Immediately pop the current node off the stack

of open elements.

Acknowledge the token's *self-closing flag*, if it is set.

If the element has a `charset` attribute, and getting an encoding from its value results in a supported ASCII-compatible character encoding or a UTF-16 encoding, and the confidence is currently *tentative*, then change the encoding to the resulting encoding.

Otherwise, if the element has an `http-equiv` attribute whose value is an ASCII case-insensitive match for the string "`Content-Type`", and the element has a `content` attribute, and applying the algorithm for extracting a character encoding from a `meta` element to that attribute's value returns a supported ASCII-compatible character encoding or a UTF-16 encoding, and the confidence is currently *tentative*, then change the encoding to the extracted encoding.

↪ **A start tag whose tag name is "title"**
Follow the generic RCDATA element parsing algorithm.

↪ **A start tag whose tag name is "noscript", if the scripting flag is enabled**
↪ **A start tag whose tag name is one of: "noframes", "style"**
Follow the generic raw text element parsing algorithm.

↪ **A start tag whose tag name is "noscript", if the scripting flag is disabled**
Insert an HTML element for the token.

Switch the insertion mode to "in head noscript".

↪ **A start tag whose tag name is "script"**
Run these steps:

1. Let the *adjusted insertion location* be the appropriate place for inserting a node.
2. Create an element for the token in the HTML namespace, with the intended parent being the element in which the *adjusted insertion location* finds itself.
3. Mark the element as being "parser-inserted" and unset the element's "force-async" flag.

> **Note:** This ensures that, if the script is external, any `document.write()` calls in the script will execute in-line, instead of blowing the document away, as would happen in most other cases. It also prevents the script from executing until the end tag is seen.

4. If the parser was originally created for the HTML fragment parsing algorithm, then mark the `script` element as "already started". (fragment case)
5. Insert the newly created element at the *adjusted insertion location*.
6. Push the element onto the stack of open elements so that it is the new current node.
7. Switch the tokenizer to the script data state.
8. Let the original insertion mode be the current insertion mode.
9. Switch the insertion mode to "text".

↪ **An end tag whose tag name is "head"**
Pop the current node (which will be the `head` element) off the stack of open elements.

Switch the insertion mode to "after head".

↪ **An end tag whose tag name is one of: "body", "html", "br"**
Act as described in the "anything else" entry below.

↪ **A start tag whose tag name is "template"**
Insert an HTML element for the token.

Insert a marker at the end of the list of active formatting elements.

Set the frameset-ok flag to "not ok".

Switch the insertion mode to "in template".

Push "in template" onto the stack of template insertion modes so that it is the new current template insertion mode.

↪ **An end tag whose tag name is "template"**
If there is no `template` element on the stack of open elements, then this is a parse error; ignore the token.

Otherwise, run these steps:

1. Generate implied end tags.
2. If the current node is not a `template` element, then this is a parse error.
3. Pop elements from the stack of open elements until a `template` element has been popped from the stack.
4. Clear the list of active formatting elements up to the last marker.
5. Pop the current template insertion mode off the stack of template insertion modes.
6. Reset the insertion mode appropriately.

↪ **A start tag whose tag name is "head"**
↪ **Any other end tag**
Parse error. Ignore the token.

↪ **Anything else**
Pop the current node (which will be the `head` element) off the stack of open elements.

Switch the insertion mode to "after head".

Reprocess the token.

8.2.5.4.5 The "in head noscript" insertion mode

When the user agent is to apply the rules for the "in head noscript" insertion mode, the user agent must handle the token as follows:

↪ **A DOCTYPE token**

Parse error. Ignore the token.

↪ **A start tag whose tag name is "html"**
Process the token using the rules for the "in body" insertion mode.

↪ **An end tag whose tag name is "noscript"**
Pop the current node (which will be a `noscript` element) from the stack of open elements; the new current node will be a `head` element.

Switch the insertion mode to "in head".

↪ **A character token that is one of U+0009 CHARACTER TABULATION, "LF" (U+000A), "FF" (U+000C), "CR" (U+000D), or U+0020 SPACE**
↪ **A comment token**
↪ **A start tag whose tag name is one of: "basefont", "bgsound", "link", "meta", "noframes", "style"**
Process the token using the rules for the "in head" insertion mode.

↪ **An end tag whose tag name is "br"**
Act as described in the "anything else" entry below.

↪ **A start tag whose tag name is one of: "head", "noscript"**
↪ **Any other end tag**
Parse error. Ignore the token.

↪ **Anything else**
Parse error.

Pop the current node (which will be a `noscript` element) from the stack of open elements; the new current node will be a `head` element.

Switch the insertion mode to "in head".

Reprocess the token.

8.2.5.4.6 The "after head" insertion mode

When the user agent is to apply the rules for the "after head" insertion mode, the user agent must handle the token as follows:

↪ **A character token that is one of U+0009 CHARACTER TABULATION, "LF" (U+000A), "FF" (U+000C), "CR" (U+000D), or U+0020 SPACE**
Insert the character.

↪ **A comment token**
Insert a comment.

↪ **A DOCTYPE token**
Parse error. Ignore the token.

↪ **A start tag whose tag name is "html"**
Process the token using the rules for the "in body" insertion mode.

↪ **A start tag whose tag name is "body"**
Insert an HTML element for the token.

Set the frameset-ok flag to "not ok".

Switch the insertion mode to "in body".

↪ **A start tag whose tag name is "frameset"**
Insert an HTML element for the token.

Switch the insertion mode to "in frameset".

↪ **A start tag whose tag name is one of: "base", "basefont", "bgsound", "link", "meta", "noframes", "script", "style", "template", "title"**
Parse error.

Push the node pointed to by the `head` element pointer onto the stack of open elements.

Process the token using the rules for the "in head" insertion mode.

Remove the node pointed to by the `head` element pointer from the stack of open elements. (It might not be the current node at this point.)

> **Note:** The `head` element pointer cannot be null at this point.

↪ **An end tag whose tag name is "template"**
Process the token using the rules for the "in head" insertion mode.

↪ **An end tag whose tag name is one of: "body", "html", "br"**
Act as described in the "anything else" entry below.

↪ **A start tag whose tag name is "head"**
↪ **Any other end tag**
Parse error. Ignore the token.

↪ **Anything else**
Insert an HTML element for a "body" start tag token with no attributes.

Switch the insertion mode to "in body".

Reprocess the current token.

8.2.5.4.7 The "in body" insertion mode

When the user agent is to apply the rules for the "in body" insertion mode, the user agent must handle the token as follows:

↪ **A character token that is U+0000 NULL**
Parse error. Ignore the token.

↪ **A character token that is one of U+0009 CHARACTER TABULATION, "LF" (U+000A), "FF" (U+000C), "CR" (U+000D), or U+0020 SPACE**
Reconstruct the active formatting elements, if any.

Insert the token's character.

↪ **Any other character token**
Reconstruct the active formatting elements, if any.

Insert the token's character.

Set the frameset-ok flag to "not ok".

↪ **A comment token**
Insert a comment.

↪ **A DOCTYPE token**
Parse error. Ignore the token.

↪ **A start tag whose tag name is "html"**
Parse error.

If there is a `template` element on the stack of open elements, then ignore the token.

Otherwise, for each attribute on the token, check to see if the attribute is already present on the top element of the stack of open elements. If it is not, add the attribute and its corresponding value to that element.

↪ **A start tag whose tag name is one of: "base", "basefont", "bgsound", "link", "meta", "noframes", "script", "style", "template", "title"**
↪ **An end tag whose tag name is "template"**
Process the token using the rules for the "in head" insertion mode.

↪ **A start tag whose tag name is "body"**
Parse error.

If the second element on the stack of open elements is not a `body` element, if the stack of open elements has only one node on it, or if there is a `template` element on the stack of open elements, then ignore the token. (fragment case)

Otherwise, set the frameset-ok flag to "not ok"; then, for each attribute on the token, check to see if the attribute is already present on the `body` element (the second element) on the stack of open elements, and if it is not, add the attribute and its corresponding value to that element.

↪ **A start tag whose tag name is "frameset"**
Parse error.

If the stack of open elements has only one node on it, or if the second element on the stack of open elements is not a `body` element, then ignore the token. (fragment case)

If the frameset-ok flag is set to "not ok", ignore the token.

Otherwise, run the following steps:

1. Remove the second element on the stack of open elements from its parent node, if it has one.
2. Pop all the nodes from the bottom of the stack of open elements, from the current node up to, but not including, the root `html` element.
3. Insert an HTML element for the token.
4. Switch the insertion mode to "in frameset".

↪ **An end-of-file token**
If there is a node in the stack of open elements that is not either a `dd` element, a `dt`

element, an li element, a p element, a tbody element, a td element, a tfoot element, a th element, a thead element, a tr element, the body element, or the html element, then this is a parse error.

If the stack of template insertion modes is not empty, then process the token using the rules for the "in template" insertion mode.

Otherwise, stop parsing.

↪ **An end tag whose tag name is "body"**

If the stack of open elements does not have a body element in scope, this is a parse error; ignore the token.

Otherwise, if there is a node in the stack of open elements that is not either a dd element, a dt element, an li element, an optgroup element, an option element, a p element, an rb element, an rp element, an rt element, an rtc element, a tbody element, a td element, a tfoot element, a th element, a thead element, a tr element, the body element, or the html element, then this is a parse error.

Switch the insertion mode to "after body".

↪ **An end tag whose tag name is "html"**

If the stack of open elements does not have a body element in scope, this is a parse error; ignore the token.

Otherwise, if there is a node in the stack of open elements that is not either a dd element, a dt element, an li element, an optgroup element, an option element, a p element, an rb element, an rp element, an rt element, an rtc element, a tbody element, a td element, a tfoot element, a th element, a thead element, a tr element, the body element, or the html element, then this is a parse error.

Switch the insertion mode to "after body".

Reprocess the token.

↪ **A start tag whose tag name is one of: "address", "article", "aside", "blockquote", "center", "details", "dialog", "dir", "div", "dl", "fieldset", "figcaption", "figure", "footer", "header", "hgroup", "main", "nav", "ol", "p", "section", "summary", "ul"**

If the stack of open elements has a p element in button scope, then close a p element.

Insert an HTML element for the token.

↪ **A start tag whose tag name is one of: "h1", "h2", "h3", "h4", "h5", "h6"**

If the stack of open elements has a p element in button scope, then close a p element.

If the current node is an HTML element whose tag name is one of "h1", "h2", "h3", "h4", "h5", or "h6", then this is a parse error; pop the current node off the stack of open elements.

Insert an HTML element for the token.

↪ **A start tag whose tag name is one of: "pre", "listing"**

If the stack of open elements has a p element in button scope, then close a p element.

Insert an HTML element for the token.

If the next token is a "LF" (U+000A) character token, then ignore that token and move on to the next one. (Newlines at the start of pre blocks are ignored as an authoring

convenience.)

Set the frameset-ok flag to "not ok".

↪ **A start tag whose tag name is "form"**

If the `form` element pointer is not null, and there is no `template` element on the stack of open elements, then this is a parse error; ignore the token.

Otherwise:

If the stack of open elements has a `p` element in button scope, then close a `p` element.

Insert an HTML element for the token, and, if there is no `template` element on the stack of open elements, set the `form` element pointer to point to the element created.

↪ **A start tag whose tag name is "li"**

Run these steps:

1. Set the frameset-ok flag to "not ok".
2. Initialize *node* to be the current node (the bottommost node of the stack).
3. *Loop*: If *node* is an `li` element, then run these substeps:
    1. Generate implied end tags, except for `li` elements.
    2. If the current node is not an `li` element, then this is a parse error.
    3. Pop elements from the stack of open elements until an `li` element has been popped from the stack.
    4. Jump to the step labeled *done* below.
4. If *node* is in the special category, but is not an `address`, `div`, or `p` element, then jump to the step labeled *done* below.
5. Otherwise, set *node* to the previous entry in the stack of open elements and return to the step labeled *loop*.
6. *Done*: If the stack of open elements has a `p` element in button scope, then close a `p` element.
7. Finally, insert an HTML element for the token.

↪ **A start tag whose tag name is one of: "dd", "dt"**

Run these steps:

1. Set the frameset-ok flag to "not ok".
2. Initialize *node* to be the current node (the bottommost node of the stack).
3. *Loop*: If *node* is a `dd` element, then run these substeps:
    1. Generate implied end tags, except for `dd` elements.
    2. If the current node is not a `dd` element, then this is a parse error.
    3. Pop elements from the stack of open elements until a `dd` element has been

popped from the stack.

4. Jump to the step labeled *done* below.

4. If *node* is a `dt` element, then run these substeps:

    1. Generate implied end tags, except for `dt` elements.

    2. If the current node is not a `dt` element, then this is a parse error.

    3. Pop elements from the stack of open elements until a `dt` element has been popped from the stack.

    4. Jump to the step labeled *done* below.

5. If *node* is in the special category, but is not an `address`, `div`, or `p` element, then jump to the step labeled *done* below.

6. Otherwise, set *node* to the previous entry in the stack of open elements and return to the step labeled *loop*.

7. *Done*: If the stack of open elements has a `p` element in button scope, then close a `p` element.

8. Finally, insert an HTML element for the token.

↪ **A start tag whose tag name is "plaintext"**

If the stack of open elements has a `p` element in button scope, then close a `p` element.

Insert an HTML element for the token.

Switch the tokenizer to the PLAINTEXT state.

> **Note:** Once a start tag with the tag name "plaintext" has been seen, that will be the last token ever seen other than character tokens (and the end-of-file token), because there is no way to switch out of the PLAINTEXT state.

↪ **A start tag whose tag name is "button"**

1. If the stack of open elements has a `button` element in scope, then run these substeps:

    1. Parse error.

    2. Generate implied end tags.

    3. Pop elements from the stack of open elements until a `button` element has been popped from the stack.

2. Reconstruct the active formatting elements, if any.

3. Insert an HTML element for the token.

4. Set the frameset-ok flag to "not ok".

↪ **An end tag whose tag name is one of: "address", "article", "aside", "blockquote", "button", "center", "details", "dialog", "dir", "div", "dl", "fieldset", "figcaption",**

"figure", "footer", "header", "hgroup", "listing", "main", "nav", "ol", "pre", "section", "summary", "ul"

If the stack of open elements does not have an element in scope that is an HTML element and with the same tag name as that of the token, then this is a parse error; ignore the token.

Otherwise, run these steps:

1. Generate implied end tags.
2. If the current node is not an HTML element with the same tag name as that of the token, then this is a parse error.
3. Pop elements from the stack of open elements until an HTML element with the same tag name as the token has been popped from the stack.

↪ **An end tag whose tag name is "form"**

If there is no `template` element on the stack of open elements, then run these substeps:

1. Let *node* be the element that the `form` element pointer is set to, or null if it is not set to an element.
2. Set the `form` element pointer to null. Otherwise, let *node* be null.
3. If *node* is null or if the stack of open elements does not have *node* in scope, then this is a parse error; abort these steps and ignore the token.
4. Generate implied end tags.
5. If the current node is not *node*, then this is a parse error.
6. Remove *node* from the stack of open elements.

If there *is* a `template` element on the stack of open elements, then run these substeps instead:

1. If the stack of open elements does not have a `form` element in scope, then this is a parse error; abort these steps and ignore the token.
2. Generate implied end tags.
3. If the current node is not a `form` element, then this is a parse error.
4. Pop elements from the stack of open elements until a `form` element has been popped from the stack.

↪ **An end tag whose tag name is "p"**

If the stack of open elements does not have a `p` element in button scope, then this is a parse error; insert an HTML element for a "p" start tag token with no attributes.

Close a `p` element.

↪ **An end tag whose tag name is "li"**

If the stack of open elements does not have an `li` element in list item scope, then this is a parse error; ignore the token.

Otherwise, run these steps:

1. Generate implied end tags, except for `li` elements.
2. If the current node is not an `li` element, then this is a parse error.
3. Pop elements from the stack of open elements until an `li` element has been popped from the stack.

↪ **An end tag whose tag name is one of: "dd", "dt"**

If the stack of open elements does not have an element in scope that is an HTML element and with the same tag name as that of the token, then this is a parse error; ignore the token.

Otherwise, run these steps:

1. Generate implied end tags, except for HTML elements with the same tag name as the token.
2. If the current node is not an HTML element with the same tag name as that of the token, then this is a parse error.
3. Pop elements from the stack of open elements until an HTML element with the same tag name as the token has been popped from the stack.

↪ **An end tag whose tag name is one of: "h1", "h2", "h3", "h4", "h5", "h6"**

If the stack of open elements does not have an element in scope that is an HTML element and whose tag name is one of "h1", "h2", "h3", "h4", "h5", or "h6", then this is a parse error; ignore the token.

Otherwise, run these steps:

1. Generate implied end tags.
2. If the current node is not an HTML element with the same tag name as that of the token, then this is a parse error.
3. Pop elements from the stack of open elements until an HTML element whose tag name is one of "h1", "h2", "h3", "h4", "h5", or "h6" has been popped from the stack.

↪ **An end tag whose tag name is "sarcasm"**

Take a deep breath, then act as described in the "any other end tag" entry below.

↪ **A start tag whose tag name is "a"**

If the list of active formatting elements contains an `a` element between the end of the list and the last marker on the list (or the start of the list if there is no marker on the list), then this is a parse error; run the adoption agency algorithm for the tag name "a", then remove that element from the list of active formatting elements and the stack of open elements if the adoption agency algorithm didn't already remove it (it might not have if the element is not in table scope).

> In the non-conforming stream `<a href="a">a<table><a href="b">b</table>x`, the first `a` element would be closed upon seeing the second one, and the "x" character would be inside a link to "b", not to "a". This is despite the fact that the outer `a` element is not in table scope (meaning that a regular `</a>` end tag at the start of the table wouldn't close the outer `a` element). The result is that the two `a` elements are indirectly nested inside each other — non-conforming markup will often result in non-conforming DOMs when parsed.

Reconstruct the active formatting elements, if any.

Insert an HTML element for the token. Push onto the list of active formatting elements that element.

↪ **A start tag whose tag name is one of: "b", "big", "code", "em", "font", "i", "s", "small", "strike", "strong", "tt", "u"**

Reconstruct the active formatting elements, if any.

Insert an HTML element for the token. Push onto the list of active formatting elements that element.

↪ **A start tag whose tag name is "nobr"**

Reconstruct the active formatting elements, if any.

If the stack of open elements has a `nobr` element in scope, then this is a parse error; run the adoption agency algorithm for the tag name "nobr", then once again reconstruct the active formatting elements, if any.

Insert an HTML element for the token. Push onto the list of active formatting elements that element.

↪ **An end tag whose tag name is one of: "a", "b", "big", "code", "em", "font", "i", "nobr", "s", "small", "strike", "strong", "tt", "u"**

Run the adoption agency algorithm for the token's tag name.

↪ **A start tag whose tag name is one of: "applet", "marquee", "object"**

Reconstruct the active formatting elements, if any.

Insert an HTML element for the token.

Insert a marker at the end of the list of active formatting elements.

Set the frameset-ok flag to "not ok".

↪ **An end tag token whose tag name is one of: "applet", "marquee", "object"**

If the stack of open elements does not have an element in scope that is an HTML element and with the same tag name as that of the token, then this is a parse error; ignore the token.

Otherwise, run these steps:

1. Generate implied end tags.
2. If the current node is not an HTML element with the same tag name as that of the token, then this is a parse error.
3. Pop elements from the stack of open elements until an HTML element with the same tag name as the token has been popped from the stack.
4. Clear the list of active formatting elements up to the last marker.

↪ **A start tag whose tag name is "table"**

If the `Document` is *not* set to quirks mode, and the stack of open elements has a `p` element in button scope, then close a `p` element.

Insert an HTML element for the token.

Set the frameset-ok flag to "not ok".

Switch the insertion mode to "in table".

↪ **An end tag whose tag name is "br"**
Parse error. Act as described in the next entry, as if this was a "br" start tag token, rather than an end tag token.

↪ **A start tag whose tag name is one of: "area", "br", "embed", "img", "keygen", "wbr"**
Reconstruct the active formatting elements, if any.

Insert an HTML element for the token. Immediately pop the current node off the stack of open elements.

Acknowledge the token's *self-closing flag*, if it is set.

Set the frameset-ok flag to "not ok".

↪ **A start tag whose tag name is "input"**
Reconstruct the active formatting elements, if any.

Insert an HTML element for the token. Immediately pop the current node off the stack of open elements.

Acknowledge the token's *self-closing flag*, if it is set.

If the token does not have an attribute with the name "type", or if it does, but that attribute's value is not an ASCII case-insensitive match for the string "`hidden`", then: set the frameset-ok flag to "not ok".

↪ **A start tag whose tag name is one of: "param", "source", "track"**
Insert an HTML element for the token. Immediately pop the current node off the stack of open elements.

Acknowledge the token's *self-closing flag*, if it is set.

↪ **A start tag whose tag name is "hr"**
If the stack of open elements has a `p` element in button scope, then close a `p` element.

Insert an HTML element for the token. Immediately pop the current node off the stack of open elements.

Acknowledge the token's *self-closing flag*, if it is set.

Set the frameset-ok flag to "not ok".

↪ **A start tag whose tag name is "image"**
Parse error. Change the token's tag name to "img" and reprocess it. (Don't ask.)

↪ **A start tag whose tag name is "isindex"**
Parse error.

If there is no `template` element on the stack of open elements and the `form` element pointer is not null, then ignore the token.

Otherwise:

Acknowledge the token's *self-closing flag*, if it is set.

Set the frameset-ok flag to "not ok".

If the stack of open elements has a p element in button scope, then close a p element.

Insert an HTML element for a "form" start tag token with no attributes, and, if there is no template element on the stack of open elements, set the form element pointer to point to the element created.

If the token has an attribute called "action", set the action attribute on the resulting form element to the value of the "action" attribute of the token.

Insert an HTML element for an "hr" start tag token with no attributes. Immediately pop the current node off the stack of open elements.

Reconstruct the active formatting elements, if any.

Insert an HTML element for a "label" start tag token with no attributes.

Insert characters (see below for what they should say).

Insert an HTML element for an "input" start tag token with all the attributes from the "isindex" token except "name", "action", and "prompt", and with an attribute named "name" with the value "isindex". (This creates an input element with the name attribute set to the magic balue "isindex".) Immediately pop the current node off the stack of open elements.

Insert more characters (see below for what they should say).

Pop the current node (which will be the label element created earlier) off the stack of open elements.

Insert an HTML element for an "hr" start tag token with no attributes. Immediately pop the current node off the stack of open elements.

Pop the current node (which will be the form element created earlier) off the stack of open elements, and, if there is no template element on the stack of open elements, set the form element pointer back to null.

Prompt: If the token has an attribute with the name "prompt", then the first stream of characters must be the same string as given in that attribute, and the second stream of characters must be empty. Otherwise, the two streams of character tokens together should, together with the input element, express the equivalent of "This is a searchable index. Enter search keywords: (input field)" in the user's preferred language.

↪ **A start tag whose tag name is "textarea"**

Run these steps:

1. Insert an HTML element for the token.
2. If the next token is a "LF" (U+000A) character token, then ignore that token and move on to the next one. (Newlines at the start of textarea elements are ignored as an authoring convenience.)
3. Switch the tokenizer to the RCDATA state.
4. Let the original insertion mode be the current insertion mode.

5. Set the frameset-ok flag to "not ok".

6. Switch the insertion mode to "text".

↪ **A start tag whose tag name is "xmp"**
If the stack of open elements has a `p` element in button scope, then close a `p` element.

Reconstruct the active formatting elements, if any.

Set the frameset-ok flag to "not ok".

Follow the generic raw text element parsing algorithm.

↪ **A start tag whose tag name is "iframe"**
Set the frameset-ok flag to "not ok".

Follow the generic raw text element parsing algorithm.

↪ **A start tag whose tag name is "noembed"**
↪ **A start tag whose tag name is "noscript", if the scripting flag is enabled**
Follow the generic raw text element parsing algorithm.

↪ **A start tag whose tag name is "select"**
Reconstruct the active formatting elements, if any.

Insert an HTML element for the token.

Set the frameset-ok flag to "not ok".

If the insertion mode is one of "in table", "in caption", "in table body", "in row", or "in cell", then switch the insertion mode to "in select in table". Otherwise, switch the insertion mode to "in select".

↪ **A start tag whose tag name is one of: "optgroup", "option"**
If the current node is an `option` element, then pop the current node off the stack of open elements.

Reconstruct the active formatting elements, if any.

Insert an HTML element for the token.

↪ **A start tag whose tag name is one of: "rb", "rp", "rtc"**
If the stack of open elements has a `ruby` element in scope, then generate implied end tags. If the current node is not then a `ruby` element, this is a parse error.

Insert an HTML element for the token.

↪ **A start tag whose tag name is "rt"**
If the stack of open elements has a `ruby` element in scope, then generate implied end tags, except for `rtc` elements. If the current node is not then a `ruby` element, this is a parse error.

Insert an HTML element for the token.

↪ **A start tag whose tag name is "math"**
Reconstruct the active formatting elements, if any.

Adjust MathML attributes for the token. (This fixes the case of MathML attributes that

are not all lowercase.)

Adjust foreign attributes for the token. (This fixes the use of namespaced attributes, in particular XLink.)

Insert a foreign element for the token, in the MathML namespace.

If the token has its *self-closing flag* set, pop the current node off the stack of open elements and acknowledge the token's *self-closing flag*.

↪ **A start tag whose tag name is "svg"**

Reconstruct the active formatting elements, if any.

Adjust SVG attributes for the token. (This fixes the case of SVG attributes that are not all lowercase.)

Adjust foreign attributes for the token. (This fixes the use of namespaced attributes, in particular XLink in SVG.)

Insert a foreign element for the token, in the SVG namespace.

If the token has its *self-closing flag* set, pop the current node off the stack of open elements and acknowledge the token's *self-closing flag*.

↪ **A start tag whose tag name is one of: "caption", "col", "colgroup", "frame", "head", "tbody", "td", "tfoot", "th", "thead", "tr"**

Parse error. Ignore the token.

↪ **Any other start tag**

Reconstruct the active formatting elements, if any.

Insert an HTML element for the token.

> **Note:** This element will be an ordinary element.

↪ **Any other end tag**

Run these steps:

1. Initialize *node* to be the current node (the bottommost node of the stack).
2. *Loop*: If *node* is an HTML element with the same tag name as the token, then:
    1. Generate implied end tags, except for HTML elements with the same tag name as the token.
    2. If *node* is not the current node, then this is a parse error.
    3. Pop all the nodes from the current node up to *node*, including *node*, then stop these steps.
3. Otherwise, if *node* is in the special category, then this is a parse error; ignore the token, and abort these steps.
4. Set *node* to the previous entry in the stack of open elements.
5. Return to the step labeled *loop*.

When the steps above say the user agent is to **close a `p` element**, it means that the user agent must run the following steps:

1. Generate implied end tags, except for `p` elements.
2. If the current node is not a `p` element, then this is a parse error.
3. Pop elements from the stack of open elements until a `p` element has been popped from the stack.

The **adoption agency algorithm**, which takes as its only argument a tag name *subject* for which the algorithm is being run, consists of the following steps:

1. If the current node is an HTML element whose tag name is *subject*, then run these substeps:
    1. Let *element* be the current node.
    2. Pop *element* off the stack of open elements.
    3. If *element* is also in the list of active formatting elements, remove the element from the list.
    4. Abort the adoption agency algorithm.
2. Let *outer loop counter* be zero.
3. *Outer loop*: If *outer loop counter* is greater than or equal to eight, then abort these steps.
4. Increment *outer loop counter* by one.
5. Let *formatting element* be the last element in the list of active formatting elements that:
    - is between the end of the list and the last scope marker in the list, if any, or the start of the list otherwise, and
    - has the tag name *subject*.

    If there is no such element, then abort these steps and instead act as described in the "any other end tag" entry above.
6. If *formatting element* is not in the stack of open elements, then this is a parse error; remove the element from the list, and abort these steps.
7. If *formatting element* is in the stack of open elements, but the element is not in scope, then this is a parse error; abort these steps.
8. If *formatting element* is not the current node, this is a parse error. (But do not abort these steps.)
9. Let *furthest block* be the topmost node in the stack of open elements that is lower in the stack than *formatting element*, and is an element in the special category. There might not be one.
10. If there is no *furthest block*, then the UA must first pop all the nodes from the bottom of the stack of open elements, from the current node up to and including *formatting element*, then remove *formatting element* from the list of active formatting elements, and finally abort these steps.

11. Let *common ancestor* be the element immediately above *formatting element* in the stack of open elements.

12. Let a bookmark note the position of *formatting element* in the list of active formatting elements relative to the elements on either side of it in the list.

13. Let *node* and *last node* be *furthest block*. Follow these steps:

    1. Let *inner loop counter* be zero.

    2. *Inner loop*: Increment *inner loop counter* by one.

    3. Let *node* be the element immediately above *node* in the stack of open elements, or if *node* is no longer in the stack of open elements (e.g. because it got removed by this algorithm), the element that was immediately above *node* in the stack of open elements before *node* was removed.

    4. If *node* is *formatting element*, then go to the next step in the overall algorithm.

    5. If *inner loop counter* is greater than three and *node* is in the list of active formatting elements, then remove *node* from the list of active formatting elements.

    6. If *node* is not in the list of active formatting elements, then remove *node* from the stack of open elements and then go back to the step labeled *inner loop*.

    7. Create an element for the token for which the element *node* was created, in the HTML namespace, with *common ancestor* as the intended parent; replace the entry for *node* in the list of active formatting elements with an entry for the new element, replace the entry for *node* in the stack of open elements with an entry for the new element, and let *node* be the new element.

    8. If *last node* is *furthest block*, then move the aforementioned bookmark to be immediately after the new *node* in the list of active formatting elements.

    9. Insert *last node* into *node*, first removing it from its previous parent node if any.

    10. Let *last node* be *node*.

    11. Return to the step labeled *inner loop*.

14. Insert whatever *last node* ended up being in the previous step at the appropriate place for inserting a node, but using *common ancestor* as the *override target*.

15. Create an element for the token for which *formatting element* was created, in the HTML namespace, with *furthest block* as the intended parent.

16. Take all of the child nodes of *furthest block* and append them to the element created in the last step.

17. Append that new element to *furthest block*.

18. Remove *formatting element* from the list of active formatting elements, and insert the new element into the list of active formatting elements at the position of the aforementioned bookmark.

19. Remove *formatting element* from the stack of open elements, and insert the new element into the stack of open elements immediately below the position of *furthest block* in that stack.

20. Jump back to the step labeled *outer loop*.

> **Note:** This algorithm's name, the "adoption agency algorithm", comes from the way it causes elements to change parents, and is in contrast with other possible algorithms for dealing with misnested content, which included the "incest algorithm", the "secret affair algorithm", and the "Heisenberg algorithm".

8.2.5.4.8 The "text" insertion mode

When the user agent is to apply the rules for the "text" insertion mode, the user agent must handle the token as follows:

↪ **A character token**

Insert the token's character.

> **Note:** This can never be a U+0000 NULL character; the tokenizer converts those to U+FFFD REPLACEMENT CHARACTER characters.

↪ **An end-of-file token**

Parse error.

If the current node is a `script` element, mark the `script` element as "already started".

Pop the current node off the stack of open elements.

Switch the insertion mode to the original insertion mode and reprocess the token.

↪ **An end tag whose tag name is "script"**

Perform a microtask checkpoint.

Provide a stable state.

Let *script* be the current node (which will be a `script` element).

Pop the current node off the stack of open elements.

Switch the insertion mode to the original insertion mode.

Let the *old insertion point* have the same value as the current insertion point. Let the insertion point be just before the next input character.

Increment the parser's script nesting level by one.

Prepare the *script*. This might cause some script to execute, which might cause new characters to be inserted into the tokenizer, and might cause the tokenizer to output more tokens, resulting in a reentrant invocation of the parser.

Decrement the parser's script nesting level by one. If the parser's script nesting level is zero, then set the parser pause flag to false.

Let the insertion point have the value of the *old insertion point*. (In other words, restore the insertion point to its previous value. This value might be the "undefined" value.)

At this stage, if there is a pending parsing-blocking script, then:

↪ **If the script nesting level is not zero:**

Set the parser pause flag to true, and abort the processing of any nested invocations of the tokenizer, yielding control back to the caller. (Tokenization will resume when the caller returns to the "outer" tree construction stage.)

> **Note:** The tree construction stage of this particular parser is being called reentrantly, say from a call to `document.write()`.

↪ **Otherwise:**

Run these steps:

1. Let *the script* be the pending parsing-blocking script. There is no longer a pending parsing-blocking script.
2. Block the tokenizer for this instance of the HTML parser, such that the event loop will not run tasks that invoke the tokenizer.
3. If the parser's `Document` has a style sheet that is blocking scripts or *the script*'s "ready to be parser-executed" flag is not set: spin the event loop until the parser's `Document` has no style sheet that is blocking scripts and *the script*'s "ready to be parser-executed" flag is set.
4. If this parser has been aborted in the meantime, abort these steps.

   > **Note:** This could happen if, e.g., while the spin the event loop algorithm is running, the browsing context gets closed, or the `document.open()` method gets invoked on the `Document`.

5. Unblock the tokenizer for this instance of the HTML parser, such that tasks that invoke the tokenizer can again be run.
6. Let the insertion point be just before the next input character.
7. Increment the parser's script nesting level by one (it should be zero before this step, so this sets it to one).
8. Execute *the script*.
9. Decrement the parser's script nesting level by one. If the parser's script nesting level is zero (which it always should be at this point), then set the parser pause flag to false.
10. Let the insertion point be undefined again.
11. If there is once again a pending parsing-blocking script, then repeat these steps from step 1.

↪ **Any other end tag**

Pop the current node off the stack of open elements.

Switch the insertion mode to the original insertion mode.

8.2.5.4.9 The "in table" insertion mode

When the user agent is to apply the rules for the "in table" insertion mode, the user agent must handle the token as follows:

↪ **A character token, if the current node is `table`, `tbody`, `tfoot`, `thead`, or `tr` element**

Let the ***pending table character tokens*** be an empty list of tokens.

Let the original insertion mode be the current insertion mode.

Switch the insertion mode to "in table text" and reprocess the token.

↪ **A comment token**

Insert a comment.

↪ **A DOCTYPE token**

Parse error. Ignore the token.

↪ **A start tag whose tag name is "caption"**

Clear the stack back to a table context. (See below.)

Insert a marker at the end of the list of active formatting elements.

Insert an HTML element for the token, then switch the insertion mode to "in caption".

↪ **A start tag whose tag name is "colgroup"**

Clear the stack back to a table context. (See below.)

Insert an HTML element for the token, then switch the insertion mode to "in column group".

↪ **A start tag whose tag name is "col"**

Clear the stack back to a table context. (See below.)

Insert an HTML element for a "colgroup" start tag token with no attributes, then switch the insertion mode to "in column group".

Reprocess the current token.

↪ **A start tag whose tag name is one of: "tbody", "tfoot", "thead"**

Clear the stack back to a table context. (See below.)

Insert an HTML element for the token, then switch the insertion mode to "in table body".

↪ **A start tag whose tag name is one of: "td", "th", "tr"**

Clear the stack back to a table context. (See below.)

Insert an HTML element for a "tbody" start tag token with no attributes, then switch the insertion mode to "in table body".

Reprocess the current token.

↪ **A start tag whose tag name is "table"**

Parse error.

If the stack of open elements does not have a `table` element in table scope, ignore the token.

Otherwise:

Pop elements from this stack until a `table` element has been popped from the stack.

Reset the insertion mode appropriately.

Reprocess the token.

↪ **An end tag whose tag name is "table"**

If the stack of open elements does not have a `table` element in table scope, this is a parse error; ignore the token.

Otherwise:

Pop elements from this stack until a `table` element has been popped from the stack.

Reset the insertion mode appropriately.

↪ **An end tag whose tag name is one of: "body", "caption", "col", "colgroup", "html", "tbody", "td", "tfoot", "th", "thead", "tr"**

Parse error. Ignore the token.

↪ **A start tag whose tag name is one of: "style", "script", "template"**
↪ **An end tag whose tag name is "template"**

Process the token using the rules for the "in head" insertion mode.

↪ **A start tag whose tag name is "input"**

If the token does not have an attribute with the name "type", or if it does, but that attribute's value is not an ASCII case-insensitive match for the string "`hidden`", then: act as described in the "anything else" entry below.

Otherwise:

Parse error.

Insert an HTML element for the token.

Pop that `input` element off the stack of open elements.

Acknowledge the token's *self-closing flag*, if it is set.

↪ **A start tag whose tag name is "form"**

Parse error.

If there is a `template` element on the stack of open elements, or if the `form` element pointer is not null, ignore the token.

Otherwise:

Insert an HTML element for the token, and set the `form` element pointer to point to the element created.

Pop that `form` element off the stack of open elements.

↪ **An end-of-file token**

Process the token using the rules for the "in body" insertion mode.

↪ **Anything else**

Parse error. Enable foster parenting, process the token using the rules for the "in body" insertion mode, and then disable foster parenting.

When the steps above require the UA to **clear the stack back to a table context**, it means that the UA must, while the current node is not a `table`, `template`, or `html` element, pop elements from the stack of open elements.

> **Note:** The current node being an `html` element after this process is a fragment case.

8.2.5.4.10 The "in table text" insertion mode

When the user agent is to apply the rules for the "in table text" insertion mode, the user agent must handle the token as follows:

↪ **A character token that is U+0000 NULL**
Parse error. Ignore the token.

↪ **Any other character token**
Append the character token to the *pending table character tokens* list.

↪ **Anything else**
If any of the tokens in the *pending table character tokens* list are character tokens that are not space characters, then reprocess the character tokens in the *pending table character tokens* list using the rules given in the "anything else" entry in the "in table" insertion mode.

Otherwise, insert the characters given by the *pending table character tokens* list.

Switch the insertion mode to the original insertion mode and reprocess the token.

8.2.5.4.11 The "in caption" insertion mode

When the user agent is to apply the rules for the "in caption" insertion mode, the user agent must handle the token as follows:

↪ **An end tag whose tag name is "caption"**
If the stack of open elements does not have a `caption` element in table scope, this is a parse error; ignore the token. (fragment case)

Otherwise:

Generate implied end tags.

Now, if the current node is not a `caption` element, then this is a parse error.

Pop elements from this stack until a `caption` element has been popped from the stack.

Clear the list of active formatting elements up to the last marker.

Switch the insertion mode to "in table".

↪ **A start tag whose tag name is one of: "caption", "col", "colgroup", "tbody", "td", "tfoot", "th", "thead", "tr"**
↪ **An end tag whose tag name is "table"**
Parse error.

If the stack of open elements does not have a `caption` element in table scope, ignore

the token. (fragment case)

Otherwise:

Pop elements from this stack until a `caption` element has been popped from the stack.

Clear the list of active formatting elements up to the last marker.

Switch the insertion mode to "in table".

Reprocess the token.

↪ **An end tag whose tag name is one of: "body", "col", "colgroup", "html", "tbody", "td", "tfoot", "th", "thead", "tr"**
Parse error. Ignore the token.

↪ **Anything else**
Process the token using the rules for the "in body" insertion mode.

8.2.5.4.12 The "in column group" insertion mode

When the user agent is to apply the rules for the "in column group" insertion mode, the user agent must handle the token as follows:

↪ **A character token that is one of U+0009 CHARACTER TABULATION, "LF" (U+000A), "FF" (U+000C), "CR" (U+000D), or U+0020 SPACE**
Insert the character.

↪ **A comment token**
Insert a comment.

↪ **A DOCTYPE token**
Parse error. Ignore the token.

↪ **A start tag whose tag name is "html"**
Process the token using the rules for the "in body" insertion mode.

↪ **A start tag whose tag name is "col"**
Insert an HTML element for the token. Immediately pop the current node off the stack of open elements.

Acknowledge the token's *self-closing flag*, if it is set.

↪ **An end tag whose tag name is "colgroup"**
If the current node is not a `colgroup` element, then this is a parse error; ignore the token.

Otherwise, pop the current node from the stack of open elements. Switch the insertion mode to "in table".

↪ **An end tag whose tag name is "col"**
Parse error. Ignore the token.

↪ **A start tag whose tag name is "template"**
↪ **An end tag whose tag name is "template"**
Process the token using the rules for the "in head" insertion mode.

↪ **An end-of-file token**
Process the token using the rules for the "in body" insertion mode.

↪ **Anything else**
If the current node is not a `colgroup` element, then this is a parse error; ignore the token.

Otherwise, pop the current node from the stack of open elements.

Switch the insertion mode to "in table".

Reprocess the token.

8.2.5.4.13 The "in table body" insertion mode

When the user agent is to apply the rules for the "in table body" insertion mode, the user agent must handle the token as follows:

↪ **A start tag whose tag name is "tr"**
Clear the stack back to a table body context. (See below.)

Insert an HTML element for the token, then switch the insertion mode to "in row".

↪ **A start tag whose tag name is one of: "th", "td"**
Parse error.

Clear the stack back to a table body context. (See below.)

Insert an HTML element for a "tr" start tag token with no attributes, then switch the insertion mode to "in row".

Reprocess the current token.

↪ **An end tag whose tag name is one of: "tbody", "tfoot", "thead"**
If the stack of open elements does not have an element in table scope that is an HTML element and with the same tag name as the token, this is a parse error; ignore the token.

Otherwise:

Clear the stack back to a table body context. (See below.)

Pop the current node from the stack of open elements. Switch the insertion mode to "in table".

↪ **A start tag whose tag name is one of: "caption", "col", "colgroup", "tbody", "tfoot", "thead"**
↪ **An end tag whose tag name is "table"**
If the stack of open elements does not have a `tbody`, `thead`, or `tfoot` element in table scope, this is a parse error; ignore the token.

Otherwise:

Clear the stack back to a table body context. (See below.)

Pop the current node from the stack of open elements. Switch the insertion mode to "in table".

Reprocess the token.

↪ **An end tag whose tag name is one of: "body", "caption", "col", "colgroup", "html", "td", "th", "tr"**
Parse error. Ignore the token.

↪ **Anything else**
Process the token using the rules for the "in table" insertion mode.

When the steps above require the UA to **clear the stack back to a table body context**, it means that the UA must, while the current node is not a `tbody`, `tfoot`, `thead`, `template`, or `html` element, pop elements from the stack of open elements.

> **Note:** The current node being an `html` element after this process is a fragment case.

8.2.5.4.14 The "in row" insertion mode

When the user agent is to apply the rules for the "in row" insertion mode, the user agent must handle the token as follows:

↪ **A start tag whose tag name is one of: "th", "td"**
Clear the stack back to a table row context. (See below.)

Insert an HTML element for the token, then switch the insertion mode to "in cell".

Insert a marker at the end of the list of active formatting elements.

↪ **An end tag whose tag name is "tr"**
If the stack of open elements does not have a `tr` element in table scope, this is a parse error; ignore the token.

Otherwise:

Clear the stack back to a table row context. (See below.)

Pop the current node (which will be a `tr` element) from the stack of open elements. Switch the insertion mode to "in table body".

↪ **A start tag whose tag name is one of: "caption", "col", "colgroup", "tbody", "tfoot", "thead", "tr"**
↪ **An end tag whose tag name is "table"**
If the stack of open elements does not have a `tr` element in table scope, this is a parse error; ignore the token.

Otherwise:

Clear the stack back to a table row context. (See below.)

Pop the current node (which will be a `tr` element) from the stack of open elements. Switch the insertion mode to "in table body".

Reprocess the token.

↪ **An end tag whose tag name is one of: "tbody", "tfoot", "thead"**
If the stack of open elements does not have an element in table scope that is an HTML element and with the same tag name as the token, this is a parse error; ignore the

token.

If the stack of open elements does not have a `tr` element in table scope, ignore the token.

Otherwise:

Clear the stack back to a table row context. (See below.)

Pop the current node (which will be a `tr` element) from the stack of open elements. Switch the insertion mode to "in table body".

Reprocess the token.

↪ **An end tag whose tag name is one of: "body", "caption", "col", "colgroup", "html", "td", "th"**
Parse error. Ignore the token.

↪ **Anything else**
Process the token using the rules for the "in table" insertion mode.

When the steps above require the UA to **clear the stack back to a table row context**, it means that the UA must, while the current node is not a `tr`, `template`, or `html` element, pop elements from the stack of open elements.

> **Note:** The current node being an `html` element after this process is a fragment case.

8.2.5.4.15 The "in cell" insertion mode

When the user agent is to apply the rules for the "in cell" insertion mode, the user agent must handle the token as follows:

↪ **An end tag whose tag name is one of: "td", "th"**
If the stack of open elements does not have an element in table scope that is an HTML element and with the same tag name as that of the token, then this is a parse error; ignore the token.

Otherwise:

Generate implied end tags.

Now, if the current node is not an HTML element with the same tag name as the token, then this is a parse error.

Pop elements from the stack of open elements stack until an HTML element with the same tag name as the token has been popped from the stack.

Clear the list of active formatting elements up to the last marker.

Switch the insertion mode to "in row".

↪ **A start tag whose tag name is one of: "caption", "col", "colgroup", "tbody", "td", "tfoot", "th", "thead", "tr"**
If the stack of open elements does *not* have a `td` or `th` element in table scope, then this is a parse error; ignore the token. (fragment case)

Otherwise, close the cell (see below) and reprocess the token.

↪ **An end tag whose tag name is one of: "body", "caption", "col", "colgroup", "html"**
Parse error. Ignore the token.

↪ **An end tag whose tag name is one of: "table", "tbody", "tfoot", "thead", "tr"**
If the stack of open elements does not have an element in table scope that is an HTML element and with the same tag name as that of the token, then this is a parse error; ignore the token.

Otherwise, close the cell (see below) and reprocess the token.

↪ **Anything else**
Process the token using the rules for the "in body" insertion mode.

Where the steps above say to **close the cell**, they mean to run the following algorithm:

1. Generate implied end tags.
2. If the current node is not now a `td` element or a `th` element, then this is a parse error.
3. Pop elements from the stack of open elements stack until a `td` element or a `th` element has been popped from the stack.
4. Clear the list of active formatting elements up to the last marker.
5. Switch the insertion mode to "in row".

> **Note:** The stack of open elements cannot have both a `td` and a `th` element in table scope at the same time, nor can it have neither when the close the cell algorithm is invoked.

8.2.5.4.16 The "in select" insertion mode

When the user agent is to apply the rules for the "in select" insertion mode, the user agent must handle the token as follows:

↪ **A character token that is U+0000 NULL**
Parse error. Ignore the token.

↪ **Any other character token**
Insert the token's character.

↪ **A comment token**
Insert a comment.

↪ **A DOCTYPE token**
Parse error. Ignore the token.

↪ **A start tag whose tag name is "html"**
Process the token using the rules for the "in body" insertion mode.

↪ **A start tag whose tag name is "option"**
If the current node is an `option` element, pop that node from the stack of open elements.

Insert an HTML element for the token.

↪ **A start tag whose tag name is "optgroup"**

If the current node is an `option` element, pop that node from the stack of open elements.

If the current node is an `optgroup` element, pop that node from the stack of open elements.

Insert an HTML element for the token.

↪ **An end tag whose tag name is "optgroup"**

First, if the current node is an `option` element, and the node immediately before it in the stack of open elements is an `optgroup` element, then pop the current node from the stack of open elements.

If the current node is an `optgroup` element, then pop that node from the stack of open elements. Otherwise, this is a parse error; ignore the token.

↪ **An end tag whose tag name is "option"**

If the current node is an `option` element, then pop that node from the stack of open elements. Otherwise, this is a parse error; ignore the token.

↪ **An end tag whose tag name is "select"**

If the stack of open elements does not have a `select` element in select scope, this is a parse error; ignore the token. (fragment case)

Otherwise:

Pop elements from the stack of open elements until a `select` element has been popped from the stack.

Reset the insertion mode appropriately.

↪ **A start tag whose tag name is "select"**

Parse error.

Pop elements from the stack of open elements until a `select` element has been popped from the stack.

Reset the insertion mode appropriately.

> **Note:** It just gets treated like an end tag.

↪ **A start tag whose tag name is one of: "input", "keygen", "textarea"**

Parse error.

If the stack of open elements does not have a `select` element in select scope, ignore the token. (fragment case)

Pop elements from the stack of open elements until a `select` element has been popped from the stack.

Reset the insertion mode appropriately.

Reprocess the token.

- **A start tag whose tag name is one of: "script", "template"**
- **An end tag whose tag name is "template"**

  Process the token using the rules for the "in head" insertion mode.

- **An end-of-file token**

  Process the token using the rules for the "in body" insertion mode.

- **Anything else**

  Parse error. Ignore the token.

8.2.5.4.17 The "in select in table" insertion mode

When the user agent is to apply the rules for the "in select in table" insertion mode, the user agent must handle the token as follows:

- **A start tag whose tag name is one of: "caption", "table", "tbody", "tfoot", "thead", "tr", "td", "th"**

  Parse error.

  Pop elements from the stack of open elements until a `select` element has been popped from the stack.

  Reset the insertion mode appropriately.

  Reprocess the token.

- **An end tag whose tag name is one of: "caption", "table", "tbody", "tfoot", "thead", "tr", "td", "th"**

  Parse error.

  If the stack of open elements does not have an element in table scope that is an HTML element and with the same tag name as that of the token, then ignore the token.

  Otherwise:

  Pop elements from the stack of open elements until a `select` element has been popped from the stack.

  Reset the insertion mode appropriately.

  Reprocess the token.

- **Anything else**

  Process the token using the rules for the "in select" insertion mode.

8.2.5.4.18 The "in template" insertion mode

When the user agent is to apply the rules for the "in template" insertion mode, the user agent must handle the token as follows:

- **A character token**
- **A comment token**
- **A DOCTYPE token**

  Process the token using the rules for the "in body" insertion mode.

↪ **A start tag whose tag name is one of: "base", "basefont", "bgsound", "link", "meta", "noframes", "script", "style", "template", "title"**

↪ **An end tag whose tag name is "template"**

Process the token using the rules for the "in head" insertion mode.

↪ **A start tag whose tag name is one of: "caption", "colgroup", "tbody", "tfoot", "thead"**

Pop the current template insertion mode off the stack of template insertion modes.

Push "in table" onto the stack of template insertion modes so that it is the new current template insertion mode.

Switch the insertion mode to "in table", and reprocess the token.

↪ **A start tag whose tag name is "col"**

Pop the current template insertion mode off the stack of template insertion modes.

Push "in column group" onto the stack of template insertion modes so that it is the new current template insertion mode.

Switch the insertion mode to "in column group", and reprocess the token.

↪ **A start tag whose tag name is "tr"**

Pop the current template insertion mode off the stack of template insertion modes.

Push "in table body" onto the stack of template insertion modes so that it is the new current template insertion mode.

Switch the insertion mode to "in table body", and reprocess the token.

↪ **A start tag whose tag name is one of: "td", "th"**

Pop the current template insertion mode off the stack of template insertion modes.

Push "in row" onto the stack of template insertion modes so that it is the new current template insertion mode.

Switch the insertion mode to "in row", and reprocess the token.

↪ **Any other start tag**

Pop the current template insertion mode off the stack of template insertion modes.

Push "in body" onto the stack of template insertion modes so that it is the new current template insertion mode.

Switch the insertion mode to "in body", and reprocess the token.

↪ **Any other end tag**

Parse error. Ignore the token.

↪ **An end-of-file token**

If there is no `template` element on the stack of open elements, then stop parsing. (fragment case)

Otherwise, this is a parse error.

Pop elements from the stack of open elements until a `template` element has been popped from the stack.

Clear the list of active formatting elements up to the last marker.

Pop the current template insertion mode off the stack of template insertion modes.

Reset the insertion mode appropriately.

Reprocess the token.

8.2.5.4.19 The "after body" insertion mode

When the user agent is to apply the rules for the "after body" insertion mode, the user agent must handle the token as follows:

- **A character token that is one of U+0009 CHARACTER TABULATION, "LF" (U+000A), "FF" (U+000C), "CR" (U+000D), or U+0020 SPACE**
  Process the token using the rules for the "in body" insertion mode.

- **A comment token**
  Insert a comment as the last child of the first element in the stack of open elements (the `html` element).

- **A DOCTYPE token**
  Parse error. Ignore the token.

- **A start tag whose tag name is "html"**
  Process the token using the rules for the "in body" insertion mode.

- **An end tag whose tag name is "html"**
  If the parser was originally created as part of the HTML fragment parsing algorithm, this is a parse error; ignore the token. (fragment case)

  Otherwise, switch the insertion mode to "after after body".

- **An end-of-file token**
  Stop parsing.

- **Anything else**
  Parse error. Switch the insertion mode to "in body" and reprocess the token.

8.2.5.4.20 The "in frameset" insertion mode

When the user agent is to apply the rules for the "in frameset" insertion mode, the user agent must handle the token as follows:

- **A character token that is one of U+0009 CHARACTER TABULATION, "LF" (U+000A), "FF" (U+000C), "CR" (U+000D), or U+0020 SPACE**
  Insert the character.

- **A comment token**
  Insert a comment.

- **A DOCTYPE token**
  Parse error. Ignore the token.

- **A start tag whose tag name is "html"**
  Process the token using the rules for the "in body" insertion mode.

↪ **A start tag whose tag name is "frameset"**
Insert an HTML element for the token.

↪ **An end tag whose tag name is "frameset"**
If the current node is the root `html` element, then this is a parse error; ignore the token. (fragment case)

Otherwise, pop the current node from the stack of open elements.

If the parser was *not* originally created as part of the HTML fragment parsing algorithm (fragment case), and the current node is no longer a `frameset` element, then switch the insertion mode to "after frameset".

↪ **A start tag whose tag name is "frame"**
Insert an HTML element for the token. Immediately pop the current node off the stack of open elements.

Acknowledge the token's *self-closing flag*, if it is set.

↪ **A start tag whose tag name is "noframes"**
Process the token using the rules for the "in head" insertion mode.

↪ **An end-of-file token**
If the current node is not the root `html` element, then this is a parse error.

> **Note:** The current node can only be the root `html` element in the fragment case.

Stop parsing.

↪ **Anything else**
Parse error. Ignore the token.

8.2.5.4.21 The "after frameset" insertion mode

When the user agent is to apply the rules for the "after frameset" insertion mode, the user agent must handle the token as follows:

↪ **A character token that is one of U+0009 CHARACTER TABULATION, "LF" (U+000A), "FF" (U+000C), "CR" (U+000D), or U+0020 SPACE**
Insert the character.

↪ **A comment token**
Insert a comment.

↪ **A DOCTYPE token**
Parse error. Ignore the token.

↪ **A start tag whose tag name is "html"**
Process the token using the rules for the "in body" insertion mode.

↪ **An end tag whose tag name is "html"**
Switch the insertion mode to "after after frameset".

↪ **A start tag whose tag name is "noframes"**
Process the token using the rules for the "in head" insertion mode.

- **An end-of-file token**
  Stop parsing.

- **Anything else**
  Parse error. Ignore the token.

8.2.5.4.22 The "after after body" insertion mode

When the user agent is to apply the rules for the "after after body" insertion mode, the user agent must handle the token as follows:

- **A comment token**
  Insert a comment as the last child of the `Document` object.

- **A DOCTYPE token**
- **A character token that is one of U+0009 CHARACTER TABULATION, "LF" (U+000A), "FF" (U+000C), "CR" (U+000D), or U+0020 SPACE**
- **A start tag whose tag name is "html"**
  Process the token using the rules for the "in body" insertion mode.

- **An end-of-file token**
  Stop parsing.

- **Anything else**
  Parse error. Switch the insertion mode to "in body" and reprocess the token.

8.2.5.4.23 The "after after frameset" insertion mode

When the user agent is to apply the rules for the "after after frameset" insertion mode, the user agent must handle the token as follows:

- **A comment token**
  Insert a comment as the last child of the `Document` object.

- **A DOCTYPE token**
- **A character token that is one of U+0009 CHARACTER TABULATION, "LF" (U+000A), "FF" (U+000C), "CR" (U+000D), or U+0020 SPACE**
- **A start tag whose tag name is "html"**
  Process the token using the rules for the "in body" insertion mode.

- **An end-of-file token**
  Stop parsing.

- **A start tag whose tag name is "noframes"**
  Process the token using the rules for the "in head" insertion mode.

- **Anything else**
  Parse error. Ignore the token.

8.2.5.5 The rules for parsing tokens in foreign content

When the user agent is to apply the rules for parsing tokens in foreign content, the user agent must handle the token as follows:

↪ **A character token that is U+0000 NULL**
Parse error. Insert a U+FFFD REPLACEMENT CHARACTER character.

↪ **A character token that is one of U+0009 CHARACTER TABULATION, "LF" (U+000A), "FF" (U+000C), "CR" (U+000D), or U+0020 SPACE**
Insert the token's character.

↪ **Any other character token**
Insert the token's character.

Set the frameset-ok flag to "not ok".

↪ **A comment token**
Insert a comment.

↪ **A DOCTYPE token**
Parse error. Ignore the token.

↪ **A start tag whose tag name is one of: "b", "big", "blockquote", "body", "br", "center", "code", "dd", "div", "dl", "dt", "em", "embed", "h1", "h2", "h3", "h4", "h5", "h6", "head", "hr", "i", "img", "li", "listing", "main", "meta", "nobr", "ol", "p", "pre", "ruby", "s", "small", "span", "strong", "strike", "sub", "sup", "table", "tt", "u", "ul", "var"**

↪ **A start tag whose tag name is "font", if the token has any attributes named "color", "face", or "size"**
Parse error.

If the parser was originally created for the HTML fragment parsing algorithm, then act as described in the "any other start tag" entry below. (fragment case)

Otherwise:

Pop an element from the stack of open elements, and then keep popping more elements from the stack of open elements until the current node is a MathML text integration point, an HTML integration point, or an element in the HTML namespace.

Then, reprocess the token.

↪ **Any other start tag**
If the adjusted current node is an element in the MathML namespace, adjust MathML attributes for the token. (This fixes the case of MathML attributes that are not all lowercase.)

If the adjusted current node is an element in the SVG namespace, and the token's tag name is one of the ones in the first column of the following table, change the tag name to the name given in the corresponding cell in the second column. (This fixes the case of SVG elements that are not all lowercase.)

Tag name	Element name
altglyph	altGlyph
altglyphdef	altGlyphDef
altglyphitem	altGlyphItem
animatecolor	animateColor
animatemotion	animateMotion
animatetransform	animateTransform

clippath	clipPath
feblend	feBlend
fecolormatrix	feColorMatrix
fecomponenttransfer	feComponentTransfer
fecomposite	feComposite
feconvolvematrix	feConvolveMatrix
fediffuselighting	feDiffuseLighting
fedisplacementmap	feDisplacementMap
fedistantlight	feDistantLight
fedropshadow	feDropShadow
feflood	feFlood
fefunca	feFuncA
fefuncb	feFuncB
fefuncg	feFuncG
fefuncr	feFuncR
fegaussianblur	feGaussianBlur
feimage	feImage
femerge	feMerge
femergenode	feMergeNode
femorphology	feMorphology
feoffset	feOffset
fepointlight	fePointLight
fespecularlighting	feSpecularLighting
fespotlight	feSpotLight
fetile	feTile
feturbulence	feTurbulence
foreignobject	foreignObject
glyphref	glyphRef
lineargradient	linearGradient
radialgradient	radialGradient
textpath	textPath

If the adjusted current node is an element in the SVG namespace, adjust SVG attributes for the token. (This fixes the case of SVG attributes that are not all lowercase.)

Adjust foreign attributes for the token. (This fixes the use of namespaced attributes, in particular XLink in SVG.)

Insert a foreign element for the token, in the same namespace as the adjusted current node.

If the token has its *self-closing flag* set, then run the appropriate steps from the

following list:

↪ **If the token's tag name is "script"**
Acknowledge the token's *self-closing flag*, and then act as described in the steps for a "script" end tag below.

↪ **Otherwise**
Pop the current node off the stack of open elements and acknowledge the token's *self-closing flag*.

↪ **An end tag whose tag name is "script", if the current node is a `script` element in the SVG namespace**
Pop the current node off the stack of open elements.

Let the *old insertion point* have the same value as the current insertion point. Let the insertion point be just before the next input character.

Increment the parser's script nesting level by one. Set the parser pause flag to true.

Process the `script` element according to the SVG rules, if the user agent supports SVG. [SVG]

> **Note:** Even if this causes new characters to be inserted into the tokenizer, the parser will not be executed reentrantly, since the parser pause flag is true.

Decrement the parser's script nesting level by one. If the parser's script nesting level is zero, then set the parser pause flag to false.

Let the insertion point have the value of the *old insertion point*. (In other words, restore the insertion point to its previous value. This value might be the "undefined" value.)

↪ **Any other end tag**
Run these steps:

1. Initialize *node* to be the current node (the bottommost node of the stack).
2. If *node*'s tag name, converted to ASCII lowercase, is not the same as the tag name of the token, then this is a parse error.
3. *Loop*: If *node* is the topmost element in the stack of open elements, abort these steps. (fragment case)
4. If *node*'s tag name, converted to ASCII lowercase, is the same as the tag name of the token, pop elements from the stack of open elements until *node* has been popped from the stack, and then abort these steps.
5. Set *node* to the previous entry in the stack of open elements.
6. If *node* is not an element in the HTML namespace, return to the step labeled *loop*.
7. Otherwise, process the token according to the rules given in the section corresponding to the current insertion mode in HTML content.

8.2.6 The end

Once the user agent **stops parsing** the document, the user agent must run the following steps:

1. Set the current document readiness to "`interactive`" and the insertion point to undefined.
2. Pop *all* the nodes off the stack of open elements.
3. If the list of scripts that will execute when the document has finished parsing is not empty, run these substeps:
    1. Spin the event loop until the first `script` in the list of scripts that will execute when the document has finished parsing has its "ready to be parser-executed" flag set *and* the parser's `Document` has no style sheet that is blocking scripts.
    2. Execute the first `script` in the list of scripts that will execute when the document has finished parsing.
    3. Remove the first `script` element from the list of scripts that will execute when the document has finished parsing (i.e. shift out the first entry in the list).
    4. If the list of scripts that will execute when the document has finished parsing is still not empty, repeat these substeps again from substep 1.
4. Queue a task to fire a simple event that bubbles named `DOMContentLoaded` at the `Document`.
5. Spin the event loop until the set of scripts that will execute as soon as possible and the list of scripts that will execute in order as soon as possible are empty.
6. Spin the event loop until there is nothing that **delays the load event** in the `Document`.
7. Queue a task to run the following substeps:
    1. Set the current document readiness to "`complete`".
    2. If the `Document` is in a browsing context, create a trusted event named `load` that does not bubble and is not cancelable and which uses the `Event` interface, and dispatch it at the `Document`'s `Window` object, with *target override* set to the `Document` object.
8. If the `Document` is in a browsing context, then queue a task to run the following substeps:
    1. If the `Document`'s page showing flag is true, then abort this task (i.e. don't fire the event below).
    2. Set the `Document`'s page showing flag to true.
    3. Fire a trusted event with the name `pageshow` at the `Window` object of the `Document`, but with its `target` set to the `Document` object (and the `currentTarget` set to the `Window` object), using the `PageTransitionEvent` interface, with the `persisted` attribute initialized to false. This event must not bubble, must not be cancelable, and has no default action.
9. If the `Document` has any pending application cache download process tasks, then queue each such task in the order they were added to the list of pending application cache download process tasks, and then empty the list of pending application cache download process tasks. The task source for these tasks is the networking task source.
10. If the `Document`'s print when loaded flag is set, then run the printing steps.

11. The `Document` is now **ready for post-load tasks**.

12. Queue a task to mark the `Document` as **completely loaded**.

When the user agent is to **abort a parser**, it must run the following steps:

1. Throw away any pending content in the input stream, and discard any future content that would have been added to it.

2. Set the current document readiness to "`interactive`".

3. Pop *all* the nodes off the stack of open elements.

4. Set the current document readiness to "`complete`".

Except where otherwise specified, the task source for the tasks mentioned in this section is the DOM manipulation task source.

8.2.7 Coercing an HTML DOM into an infoset

When an application uses an HTML parser in conjunction with an XML pipeline, it is possible that the constructed DOM is not compatible with the XML tool chain in certain subtle ways. For example, an XML toolchain might not be able to represent attributes with the name `xmlns`, since they conflict with the Namespaces in XML syntax. There is also some data that the HTML parser generates that isn't included in the DOM itself. This section specifies some rules for handling these issues.

If the XML API being used doesn't support DOCTYPEs, the tool may drop DOCTYPEs altogether.

If the XML API doesn't support attributes in no namespace that are named "`xmlns`", attributes whose names start with "`xmlns:`", or attributes in the XMLNS namespace, then the tool may drop such attributes.

The tool may annotate the output with any namespace declarations required for proper operation.

If the XML API being used restricts the allowable characters in the local names of elements and attributes, then the tool may map all element and attribute local names that the API wouldn't support to a set of names that *are* allowed, by replacing any character that isn't supported with the uppercase letter U and the six digits of the character's Unicode code point when expressed in hexadecimal, using digits 0-9 and capital letters A-F as the symbols, in increasing numeric order.

> For example, the element name `foo<bar`, which can be output by the HTML parser, though it is neither a legal HTML element name nor a well-formed XML element name, would be converted into `fooU00003Cbar`, which *is* a well-formed XML element name (though it's still not legal in HTML by any means).

> As another example, consider the attribute `xlink:href`. Used on a MathML element, it becomes, after being adjusted, an attribute with a prefix "`xlink`" and a local name "`href`". However, used on an HTML element, it becomes an attribute with no prefix and the local name "`xlink:href`", which is not a valid NCName, and thus might not be accepted by an XML API. It could thus get converted, becoming "`xlinkU00003Ahref`".

> **Note:** The resulting names from this conversion conveniently can't clash with any attribute generated by the HTML parser, since those are all either lowercase or those listed in the adjust foreign attributes algorithm's table.

If the XML API restricts comments from having two consecutive U+002D HYPHEN-MINUS characters (--), the tool may insert a single U+0020 SPACE character between any such offending characters.

If the XML API restricts comments from ending in a "-" (U+002D) character, the tool may insert a single U+0020 SPACE character at the end of such comments.

If the XML API restricts allowed characters in character data, attribute values, or comments, the tool may replace any "FF" (U+000C) character with a U+0020 SPACE character, and any other literal non-XML character with a U+FFFD REPLACEMENT CHARACTER.

If the tool has no way to convey out-of-band information, then the tool may drop the following information:

- Whether the document is set to *no-quirks mode*, *limited-quirks mode*, or *quirks mode*
- The association between form controls and forms that aren't their nearest `form` element ancestor (use of the `form` element pointer in the parser)
- The template contents of any `template` elements.

> **Note:** The mutations allowed by this section apply after the HTML parser's rules have been applied. For example, a `<a::>` start tag will be closed by a `</a::>` end tag, and never by a `</aU00003AU00003A>` end tag, even if the user agent is using the rules above to then generate an actual element in the DOM with the name `aU00003AU00003A` for that start tag.

8.2.8 An introduction to error handling and strange cases in the parser

This section is non-normative.

This section examines some erroneous markup and discusses how the HTML parser handles these cases.

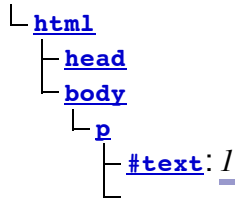
*8.2.8.1 Misnested tags: *

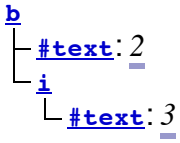
This section is non-normative.

The most-often discussed example of erroneous markup is as follows:

```
<p>1<b>2<i>3</b>4</i>5</p>
```

The parsing of this markup is straightforward up to the "3". At this point, the DOM looks like this:

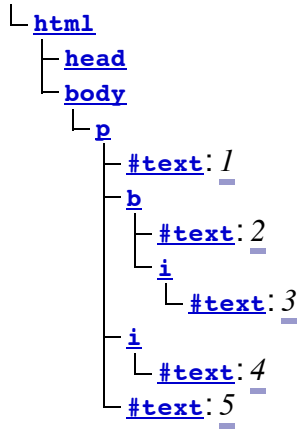




Here, the stack of open elements has five elements on it: `html`, `body`, `p`, `b`, and `i`. The list of active formatting elements just has two: `b` and `i`. The insertion mode is "in body".

Upon receiving the end tag token with the tag name "b", the "adoption agency algorithm" is invoked. This is a simple case, in that the *formatting element* is the `b` element, and there is no *furthest block*. Thus, the stack of open elements ends up with just three elements: `html`, `body`, and `p`, while the list of active formatting elements has just one: `i`. The DOM tree is unmodified at this point.

The next token is a character ("4"), triggers the reconstruction of the active formatting elements, in this case just the `i` element. A new `i` element is thus created for the "4" `Text` node. After the end tag token for the "i" is also received, and the "5" `Text` node is inserted, the DOM looks as follows:



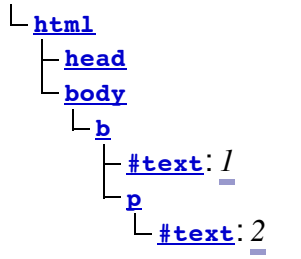
*8.2.8.2 Misnested tags: *

This section is non-normative.

A case similar to the previous one is the following:

```
<b>1<p>2</b>3</p>
```

Up to the "2" the parsing here is straightforward:



The interesting part is when the end tag token with the tag name "b" is parsed.

Before that token is seen, the stack of open elements has four elements on it: `html`, `body`, `b`, and `p`. The list of active formatting elements just has the one: `b`. The insertion mode is "in body".

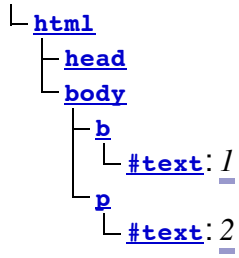
Upon receiving the end tag token with the tag name "b", the "adoption agency algorithm" is

invoked, as in the previous example. However, in this case, there *is* a *furthest block*, namely the p element. Thus, this time the adoption agency algorithm isn't skipped over.

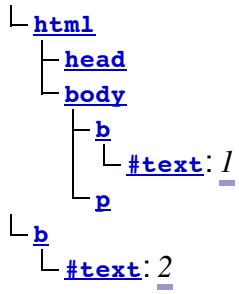
The *common ancestor* is the body element. A conceptual "bookmark" marks the position of the b in the list of active formatting elements, but since that list has only one element in it, the bookmark won't have much effect.

As the algorithm progresses, *node* ends up set to the formatting element (b), and *last node* ends up set to the *furthest block* (p).

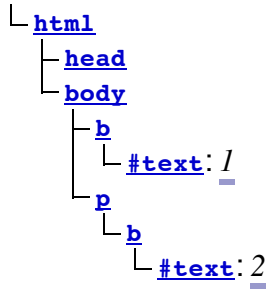
The *last node* gets appended (moved) to the *common ancestor*, so that the DOM looks like:



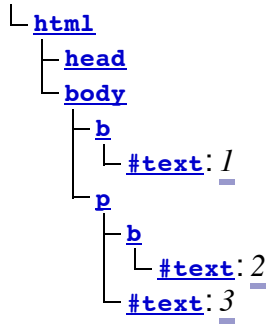
A new b element is created, and the children of the p element are moved to it:



Finally, the new b element is appended to the p element, so that the DOM looks like:



The b element is removed from the list of active formatting elements and the stack of open elements, so that when the "3" is parsed, it is appended to the p element:



8.2.8.3 Unexpected markup in tables

This section is non-normative.

Error handling in tables is, for historical reasons, especially strange. For example, consider the following markup:

```
<table><b><tr><td>aaa</td></tr>bbb</table>ccc
```

The highlighted b element start tag is not allowed directly inside a table like that, and the parser handles this case by placing the element *before* the table. (This is called *foster parenting*.) This can be seen by examining the DOM tree as it stands just after the table element's start tag has been seen:

```
└ html
  ├ head
  └ body
    └ table
```

...and then immediately after the b element start tag has been seen:

```
└ html
  ├ head
  └ body
    ├ b
    └ table
```

At this point, the stack of open elements has on it the elements html, body, table, and b (in that order, despite the resulting DOM tree); the list of active formatting elements just has the b element in it; and the insertion mode is "in table".

The tr start tag causes the b element to be popped off the stack and a tbody start tag to be implied; the tbody and tr elements are then handled in a rather straight-forward manner, taking the parser through the "in table body" and "in row" insertion modes, after which the DOM looks as follows:

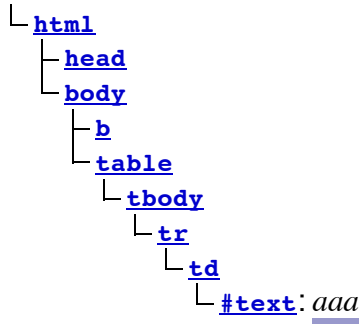
```
└ html
  ├ head
  └ body
    ├ b
    └ table
      └ tbody
        └ tr
```

Here, the stack of open elements has on it the elements html, body, table, tbody, and tr; the list of active formatting elements still has the b element in it; and the insertion mode is "in row".

The td element start tag token, after putting a td element on the tree, puts a marker on the list of active formatting elements (it also switches to the "in cell" insertion mode).

```
└ html
  ├ head
  └ body
    ├ b
    └ table
      └ tbody
        └ tr
          └ td
```

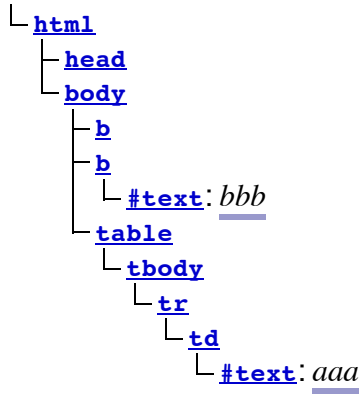
The marker means that when the "aaa" character tokens are seen, no b element is created to hold the resulting Text node:



The end tags are handled in a straight-forward manner; after handling them, the stack of open elements has on it the elements html, body, table, and tbody; the list of active formatting elements still has the b element in it (the marker having been removed by the "td" end tag token); and the insertion mode is "in table body".

Thus it is that the "bbb" character tokens are found. These trigger the "in table text" insertion mode to be used (with the original insertion mode set to "in table body"). The character tokens are collected, and when the next token (the table element end tag) is seen, they are processed as a group. Since they are not all spaces, they are handled as per the "anything else" rules in the "in table" insertion mode, which defer to the "in body" insertion mode but with foster parenting.

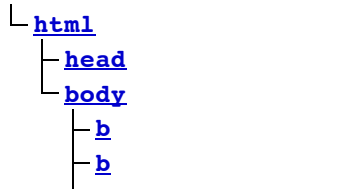
When the active formatting elements are reconstructed, a b element is created and foster parented, and then the "bbb" Text node is appended to it:

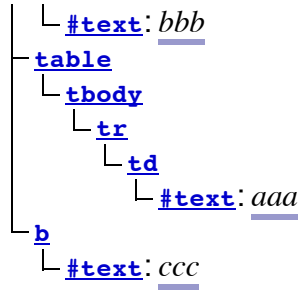


The stack of open elements has on it the elements html, body, table, tbody, and the new b (again, note that this doesn't match the resulting tree!); the list of active formatting elements has the new b element in it; and the insertion mode is still "in table body".

Had the character tokens been only space characters instead of "bbb", then those space characters would just be appended to the tbody element.

Finally, the table is closed by a "table" end tag. This pops all the nodes from the stack of open elements up to and including the table element, but it doesn't affect the list of active formatting elements, so the "ccc" character tokens after the table result in yet another b element being created, this time after the table:





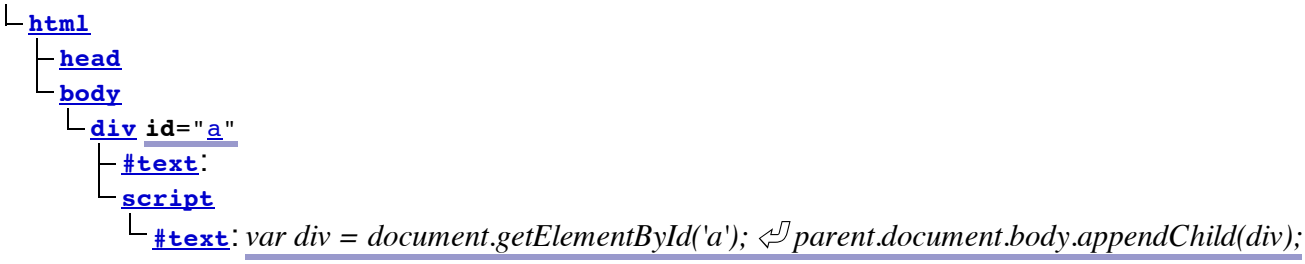
8.2.8.4 Scripts that modify the page as it is being parsed

This section is non-normative.

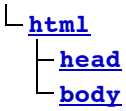
Consider the following markup, which for this example we will assume is the document with URL `http://example.com/inner`, being rendered as the content of an `iframe` in another document with the URL `http://example.com/outer`:

```
<div id=a>
 <script>
  var div = document.getElementById('a');
  parent.document.body.appendChild(div);
 </script>
 <script>
  alert(document.URL);
 </script>
</div>
<script>
 alert(document.URL);
</script>
```

Up to the first "script" end tag, before the script is parsed, the result is relatively straightforward:



After the script is parsed, though, the `div` element and its child `script` element are gone:



They are, at this point, in the `Document` of the aforementioned outer browsing context. However, the stack of open elements *still contains the `div` element*.

Thus, when the second `script` element is parsed, it is inserted *into the outer `Document` object*.

Those parsed into different `Document`s than the one the parser was created for do not execute, so the first alert does not show.

Once the `div` element's end tag is parsed, the `div` element is popped off the stack, and so the next `script` element is in the inner `Document`:

- head
- body
  - script
    - #text: *alert(document.URL);*

This script does execute, resulting in an alert that says "http://example.com/inner".

8.2.8.5 The execution of scripts that are moving across multiple documents

This section is non-normative.

Elaborating on the example in the previous section, consider the case where the second `script` element is an external script (i.e. one with a `src` attribute). Since the element was not in the parser's `Document` when it was created, that external script is not even downloaded.

In a case where a `script` element with a `src` attribute is parsed normally into its parser's `Document`, but while the external script is being downloaded, the element is moved to another document, the script continues to download, but does not execute.

> **Note:** In general, moving `script` elements between `Document`s is considered a bad practice.

8.2.8.6 Unclosed formatting elements

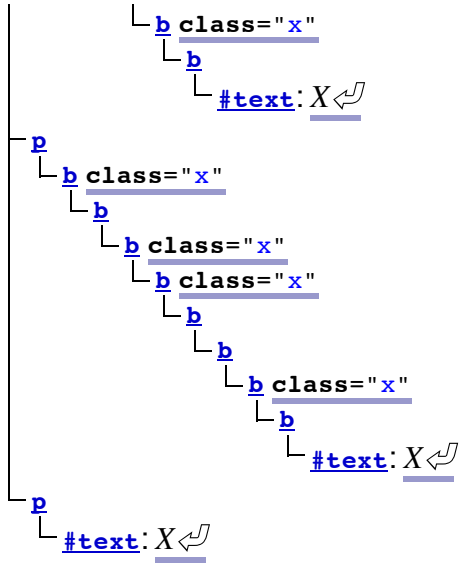
This section is non-normative.

The following markup shows how nested formatting elements (such as `b`) get collected and continue to be applied even as the elements they are contained in are closed, but that excessive duplicates are thrown away.

```
<!DOCTYPE html>
<p><b class=x><b class=x><b><b class=x><b class=x><b>X
<p>X
<p><b><b class=x><b>X
<p></b></b></b></b></b></b>X
```

The resulting DOM tree is as follows:

- DOCTYPE: html
- html
  - head
  - body
    - p
      - b class="x"
        - b class="x"
          - b
            - b class="x"
              - b class="x"
                - b
                  - #text: X⏎
    - p
      - b class="x"
        - b
          - b class="x"



Note how the second `p` element in the markup has no explicit `b` elements, but in the resulting DOM, up to three of each kind of formatting element (in this case three `b` elements with the class attribute, and two unadorned `b` elements) get reconstructed before the element's "X".

Also note how this means that in the final paragraph only six `b` end tags are needed to completely clear the list of formatting elements, even though nine `b` start tags have been seen up to this point.

8.3 Serializing HTML fragments

The following steps form the **HTML fragment serialization algorithm**. The algorithm takes as input a DOM `Element`, `Document`, or `DocumentFragment` referred to as *the node*, and either returns a string or throws an exception.

> **Note:** This algorithm serializes the children of the node being serialized, not the node itself.

1. Let *s* be a string, and initialize it to the empty string.
2. If *the node* is a `template` element, then let *the node* instead be the `template` element's template contents (a `DocumentFragment` node).
3. For each child node of *the node*, in tree order, run the following steps:
    1. Let *current node* be the child node being processed.
    2. Append the appropriate string from the following list to *s*:

        ↪ **If *current node* is an `Element`**

        If *current node* is an element in the HTML namespace, the MathML namespace, or the SVG namespace, then let *tagname* be *current node*'s local name. Otherwise, let *tagname* be *current node*'s qualified name.

        Append a "<" (U+003C) character, followed by *tagname*.

        > **Note:** For HTML elements created by the HTML parser or `Document.createElement()`, *tagname* will be lowercase.

For each attribute that the element has, append a U+0020 SPACE character, the attribute's serialized name as described below, a "=" (U+003D) character, a U+0022 QUOTATION MARK character ("), the attribute's value, escaped as described below in *attribute mode*, and a second U+0022 QUOTATION MARK character (").

An **attribute's serialized name** for the purposes of the previous paragraph must be determined as follows:

- **If the attribute has no namespace**
  The attribute's serialized name is the attribute's local name.

  > **Note:** For attributes on HTML elements set by the HTML parser or by `Element.setAttribute()`, the local name will be lowercase.

- **If the attribute is in the XML namespace**
  The attribute's serialized name is the string "`xml:`" followed by the attribute's local name.

- **If the attribute is in the XMLNS namespace and the attribute's local name is `xmlns`**
  The attribute's serialized name is the string "`xmlns`".

- **If the attribute is in the XMLNS namespace and the attribute's local name is not `xmlns`**
  The attribute's serialized name is the string "`xmlns:`" followed by the attribute's local name.

- **If the attribute is in the XLink namespace**
  The attribute's serialized name is the string "`xlink:`" followed by the attribute's local name.

- **If the attribute is in some other namespace**
  The attribute's serialized name is the attribute's qualified name.

While the exact order of attributes is UA-defined, and may depend on factors such as the order that the attributes were given in the original markup, the sort order must be stable, such that consecutive invocations of this algorithm serialize an element's attributes in the same order.

Append a ">" (U+003E) character.

If *current node* is an `area`, `base`, `basefont`, `bgsound`, `br`, `col`, `embed`, `frame`, `hr`, `img`, `input`, `keygen`, `link`, `meta`, `param`, `source`, `track` or `wbr` element, then continue on to the next child node at this point.

If *current node* is a `pre`, `textarea`, or `listing` element, and the first child node of the element, if any, is a `Text` node whose character data has as its first character a "LF" (U+000A) character, then append a "LF" (U+000A) character.

Append the value of running the HTML fragment serialization algorithm on the *current node* element (thus recursing into this algorithm for that element), followed by a "</" (U+003C) character, a U+002F SOLIDUS

character (/), *tagname* again, and finally a U+003E GREATER-THAN SIGN character (>).

↪ **If *current node* is a `Text` node**

If the parent of *current node* is a `style`, `script`, `xmp`, `iframe`, `noembed`, `noframes`, or `plaintext` element, or if the parent of *current node* is a `noscript` element and scripting is enabled for the node, then append the value of *current node*'s `data` IDL attribute literally.

Otherwise, append the value of *current node*'s `data` IDL attribute, escaped as described below.

↪ **If *current node* is a `Comment`**

Append the literal string `<!--` (U+003C LESS-THAN SIGN, U+0021 EXCLAMATION MARK, U+002D HYPHEN-MINUS, U+002D HYPHEN-MINUS), followed by the value of *current node*'s `data` IDL attribute, followed by the literal string `-->` (U+002D HYPHEN-MINUS, U+002D HYPHEN-MINUS, U+003E GREATER-THAN SIGN).

↪ **If *current node* is a `ProcessingInstruction`**

Append the literal string `<?` (U+003C LESS-THAN SIGN, U+003F QUESTION MARK), followed by the value of *current node*'s `target` IDL attribute, followed by a single U+0020 SPACE character, followed by the value of *current node*'s `data` IDL attribute, followed by a single ">" (U+003E) character.

↪ **If *current node* is a `DocumentType`**

Append the literal string `<!DOCTYPE` (U+003C LESS-THAN SIGN, U+0021 EXCLAMATION MARK, U+0044 LATIN CAPITAL LETTER D, U+004F LATIN CAPITAL LETTER O, U+0043 LATIN CAPITAL LETTER C, U+0054 LATIN CAPITAL LETTER T, U+0059 LATIN CAPITAL LETTER Y, U+0050 LATIN CAPITAL LETTER P, U+0045 LATIN CAPITAL LETTER E), followed by a space (U+0020 SPACE), followed by the value of *current node*'s `name` IDL attribute, followed by the literal string `>` (U+003E GREATER-THAN SIGN).

4. The result of the algorithm is the string *s*.

⚠**Warning!** It is possible that the output of this algorithm, if parsed with an HTML parser, will not return the original tree structure.

Code Example:

For instance, if a `textarea` element to which a `Comment` node has been appended is serialized and the output is then reparsed, the comment will end up being displayed in the text field. Similarly, if, as a result of DOM manipulation, an element contains a comment that contains the literal string "`-->`", then when the result of serializing the element is parsed, the comment will be truncated at that point and the rest of the comment will be interpreted as markup. More examples would be making a `script` element contain a `Text` node with the text string "`</script>`", or having a `p` element that contains a `ul` element (as the `ul` element's start tag would imply the end tag for the `p`).

This can enable cross-site scripting attacks. An example of this would be a page that lets the user enter some font family names that are then inserted into a CSS `style` block via the

> DOM and which then uses the `innerHTML` IDL attribute to get the HTML serialization of that `style` element: if the user enters "`</style><script>attack</script>`" as a font family name, `innerHTML` will return markup that, if parsed in a different context, would contain a `script` node, even though no `script` node existed in the original DOM.

Escaping a string (for the purposes of the algorithm above) consists of running the following steps:

1. Replace any occurrence of the "`&`" character by the string "`&`".
2. Replace any occurrences of the U+00A0 NO-BREAK SPACE character by the string "` `".
3. If the algorithm was invoked in the *attribute mode*, replace any occurrences of the "`"`" character by the string "`&quot;`".
4. If the algorithm was *not* invoked in the *attribute mode*, replace any occurrences of the "`<`" character by the string "`<`", and any occurrences of the "`>`" character by the string "`>`".

8.4 Parsing HTML fragments

The following steps form the **HTML fragment parsing algorithm**. The algorithm optionally takes as input an `Element` node, referred to as the ***context*** element, which gives the context for the parser, as well as *input*, a string to parse, and returns a list of zero or more nodes.

> **Note:** Parts marked **fragment case** in algorithms in the parser section are parts that only occur if the parser was created for the purposes of this algorithm (and with a *context* element). The algorithms have been annotated with such markings for informational purposes only; such markings have no normative weight. If it is possible for a condition described as a fragment case to occur even when the parser wasn't created for the purposes of handling this algorithm, then that is an error in the specification.

1. Create a new `Document` node, and mark it as being an HTML document.
2. If there is a *context* element, and the `Document` of the *context* element is in quirks mode, then let the `Document` be in quirks mode. Otherwise, if there is a *context* element, and the `Document` of the *context* element is in limited-quirks mode, then let the `Document` be in limited-quirks mode. Otherwise, leave the `Document` in no-quirks mode.
3. Create a new HTML parser, and associate it with the just created `Document` node.
4. If there is a *context* element, run these substeps:
    1. Set the state of the HTML parser's tokenization stage as follows:

        ↪ **If it is a `title` or `textarea` element**
        Switch the tokenizer to the RCDATA state.

        ↪ **If it is a `style`, `xmp`, `iframe`, `noembed`, or `noframes` element**
        Switch the tokenizer to the RAWTEXT state.

        ↪ **If it is a `script` element**
        Switch the tokenizer to the script data state.

        ↪ **If it is a `noscript` element**

If the scripting flag is enabled, switch the tokenizer to the RAWTEXT state. Otherwise, leave the tokenizer in the data state.

↪ **If it is a `plaintext` element**
Switch the tokenizer to the PLAINTEXT state.

↪ **Otherwise**
Leave the tokenizer in the data state.

> **Note:** For performance reasons, an implementation that does not report errors and that uses the actual state machine described in this specification directly could use the PLAINTEXT state instead of the RAWTEXT and script data states where those are mentioned in the list above. Except for rules regarding parse errors, they are equivalent, since there is no appropriate end tag token in the fragment case, yet they involve far fewer state transitions.

2. Let *root* be a new `html` element with no attributes.
3. Append the element *root* to the `Document` node created above.
4. Set up the parser's stack of open elements so that it contains just the single element *root*.
5. If the *context* element is a `template` element, push "in template" onto the stack of template insertion modes so that it is the new current template insertion mode.
6. Reset the parser's insertion mode appropriately.

> **Note:** The parser will reference the *context* element as part of that algorithm.

7. Set the parser's `form` element pointer to the nearest node to the *context* element that is a `form` element (going straight up the ancestor chain, and including the element itself, if it is a `form` element), if any. (If there is no such `form` element, the `form` element pointer keeps its initial value, null.)

5. Place into the input stream for the HTML parser just created the *input*. The encoding confidence is *irrelevant*.
6. Start the parser and let it run until it has consumed all the characters just inserted into the input stream.
7. If there is a *context* element, return the child nodes of *root*, in tree order.

   Otherwise, return the children of the `Document` object, in tree order.

8.5 Named character references

This table lists the character reference names that are supported by HTML, and the code points to which they refer. It is referenced by the previous sections.

Name	Character(s)	Glyph
`Aacute;`	U+000C1	Á
`Aacute`	U+000C1	Á
`aacute;`	U+000E1	á

aacute	U+000E1	á
Abreve;	U+00102	Ă
abreve;	U+00103	ă
ac;	U+0223E	∾
acd;	U+0223F	∿
acE;	U+0223E U+00333	∾̳
Acirc;	U+000C2	Â
Acirc	U+000C2	Â
acirc;	U+000E2	â
acirc	U+000E2	â
acute;	U+000B4	´
acute	U+000B4	´
Acy;	U+00410	А
acy;	U+00430	а
AElig;	U+000C6	Æ
AElig	U+000C6	Æ
aelig;	U+000E6	æ
aelig	U+000E6	æ
af;	U+02061	
Afr;	U+1D504	𝔄
afr;	U+1D51E	𝔞
Agrave;	U+000C0	À
Agrave	U+000C0	À
agrave;	U+000E0	à
agrave	U+000E0	à
alefsym;	U+02135	ℵ
aleph;	U+02135	ℵ
Alpha;	U+00391	Α
alpha;	U+003B1	α
Amacr;	U+00100	Ā
amacr;	U+00101	ā
amalg;	U+02A3F	⨿
AMP;	U+00026	&
AMP	U+00026	&
amp;	U+00026	&
amp	U+00026	&
And;	U+02A53	⩓
and;	U+02227	∧
andand;	U+02A55	⩕
andd;	U+02A5C	⩜
andslope;	U+02A58	⩘
andv;	U+02A5A	⩚
ang;	U+02220	∠
ange;	U+029A4	⦤
angle;	U+02220	∠
angmsd;	U+02221	∡
angmsdaa;	U+029A8	⦨
angmsdab;	U+029A9	⦩
angmsdac;	U+029AA	⦪
angmsdad;	U+029AB	⦫
angmsdae;	U+029AC	⦬
angmsdaf;	U+029AD	⦭
angmsdag;	U+029AE	⦮
angmsdah;	U+029AF	⦯
angrt;	U+0221F	∟
angrtvb;	U+022BE	⊾
angrtvbd;	U+0299D	⦝
angsph;	U+02222	∢
angst;	U+000C5	Å
angzarr;	U+0237C	⍼
Aogon;	U+00104	Ą
aogon;	U+00105	ą
Aopf;	U+1D538	𝔸
aopf;	U+1D552	𝕒

ap;	U+02248	≈
apacir;	U+02A6F	⩯
apE;	U+02A70	⩰
ape;	U+0224A	≊
apid;	U+0224B	≋
apos;	U+00027	'
ApplyFunction;	U+02061	
approx;	U+02248	≈
approxeq;	U+0224A	≊
Aring;	U+000C5	Å
Aring	U+000C5	Å
aring;	U+000E5	å
aring	U+000E5	å
Ascr;	U+1D49C	𝒜
ascr;	U+1D4B6	𝒶
Assign;	U+02254	≔
ast;	U+0002A	*
asymp;	U+02248	≈
asympeq;	U+0224D	≍
Atilde;	U+000C3	Ã
Atilde	U+000C3	Ã
atilde;	U+000E3	ã
atilde	U+000E3	ã
Auml;	U+000C4	Ä
Auml	U+000C4	Ä
auml;	U+000E4	ä
auml	U+000E4	ä
awconint;	U+02233	∳
awint;	U+02A11	⨑
backcong;	U+0224C	≌
backepsilon;	U+003F6	϶
backprime;	U+02035	‵
backsim;	U+0223D	∽
backsimeq;	U+022CD	⋍
Backslash;	U+02216	∖
Barv;	U+02AE7	⫧
barvee;	U+022BD	⊽
Barwed;	U+02306	⌆
barwed;	U+02305	⌅
barwedge;	U+02305	⌅
bbrk;	U+023B5	⎵
bbrktbrk;	U+023B6	⎶
bcong;	U+0224C	≌
Bcy;	U+00411	Б
bcy;	U+00431	б
bdquo;	U+0201E	„
becaus;	U+02235	∵
Because;	U+02235	∵
because;	U+02235	∵
bemptyv;	U+029B0	⦰
bepsi;	U+003F6	϶
bernou;	U+0212C	ℬ
Bernoullis;	U+0212C	ℬ
Beta;	U+00392	Β
beta;	U+003B2	β
beth;	U+02136	ℶ
between;	U+0226C	≬
Bfr;	U+1D505	𝔅
bfr;	U+1D51F	𝔟
bigcap;	U+022C2	⋂
bigcirc;	U+025EF	◯
bigcup;	U+022C3	⋃
bigodot;	U+02A00	⨀
bigoplus;	U+02A01	⨁

bigoplus;	U+02A01	⨁
bigotimes;	U+02A02	⨂
bigsqcup;	U+02A06	⨆
bigstar;	U+02605	★
bigtriangledown;	U+025BD	▽
bigtriangleup;	U+025B3	△
biguplus;	U+02A04	⨄
bigvee;	U+022C1	⋁
bigwedge;	U+022C0	⋀
bkarow;	U+0290D	⤍
blacklozenge;	U+029EB	⧫
blacksquare;	U+025AA	▪
blacktriangle;	U+025B4	▴
blacktriangledown;	U+025BE	▾
blacktriangleleft;	U+025C2	◂
blacktriangleright;	U+025B8	▸
blank;	U+02423	␣
blk12;	U+02592	▒
blk14;	U+02591	░
blk34;	U+02593	▓
block;	U+02588	█
bne;	U+0003D U+020E5	=⃥
bnequiv;	U+02261 U+020E5	≡⃥
bNot;	U+02AED	⫭
bnot;	U+02310	⌐
Bopf;	U+1D539	𝔹
bopf;	U+1D553	𝕓
bot;	U+022A5	⊥
bottom;	U+022A5	⊥
bowtie;	U+022C8	⋈
boxbox;	U+029C9	⧉
boxDL;	U+02557	╗
boxDl;	U+02556	╖
boxdL;	U+02555	╕
boxdl;	U+02510	┐
boxDR;	U+02554	╔
boxDr;	U+02553	╓
boxdR;	U+02552	╒
boxdr;	U+0250C	┌
boxH;	U+02550	═
boxh;	U+02500	─
boxHD;	U+02566	╦
boxHd;	U+02564	╤
boxhD;	U+02565	╥
boxhd;	U+0252C	┬
boxHU;	U+02569	╩
boxHu;	U+02567	╧
boxhU;	U+02568	╨
boxhu;	U+02534	┴
boxminus;	U+0229F	⊟
boxplus;	U+0229E	⊞
boxtimes;	U+022A0	⊠
boxUL;	U+0255D	╝
boxUl;	U+0255C	╜
boxuL;	U+0255B	╛
boxul;	U+02518	┘
boxUR;	U+0255A	╚
boxUr;	U+02559	╙
boxuR;	U+02558	╘
boxur;	U+02514	└
boxV;	U+02551	║
boxv;	U+02502	│
boxVH;	U+0256C	╬
boxVh;	U+0256B	╫
boxvH;	U+0256A	╪
boxvh;	U+0253C	┼

boxVL;	U+02563	╣
boxVl;	U+02562	╢
boxvL;	U+02561	╡
boxvl;	U+02524	┤
boxVR;	U+02560	╠
boxVr;	U+0255F	╟
boxvR;	U+0255E	╞
boxvr;	U+0251C	├
bprime;	U+02035	‵
Breve;	U+002D8	˘
breve;	U+002D8	˘
brvbar;	U+000A6	¦
brvbar	U+000A6	¦
Bscr;	U+0212C	ℬ
bscr;	U+1D4B7	𝒷
bsemi;	U+0204F	⁏
bsim;	U+0223D	∽
bsime;	U+022CD	⋍
bsol;	U+0005C	\
bsolb;	U+029C5	⧅
bsolhsub;	U+027C8	\⊂
bull;	U+02022	•
bullet;	U+02022	•
bump;	U+0224E	≎
bumpE;	U+02AAE	⪮
bumpe;	U+0224F	≏
Bumpeq;	U+0224E	≎
bumpeq;	U+0224F	≏
Cacute;	U+00106	Ć
cacute;	U+00107	ć
Cap;	U+022D2	⋒
cap;	U+02229	∩
capand;	U+02A44	⩄
capbrcup;	U+02A49	⩉
capcap;	U+02A4B	⩋
capcup;	U+02A47	⩇
capdot;	U+02A40	⩀
CapitalDifferentialD;	U+02145	ⅅ
caps;	U+02229 U+0FE00	∩
caret;	U+02041	⁁
caron;	U+002C7	ˇ
Cayleys;	U+0212D	ℭ
ccaps;	U+02A4D	⩍
Ccaron;	U+0010C	Č
ccaron;	U+0010D	č
Ccedil;	U+000C7	Ç
Ccedil	U+000C7	Ç
ccedil;	U+000E7	ç
ccedil	U+000E7	ç
Ccirc;	U+00108	Ĉ
ccirc;	U+00109	ĉ
Cconint;	U+02230	∰
ccups;	U+02A4C	⩌
ccupssm;	U+02A50	⩐
Cdot;	U+0010A	Ċ
cdot;	U+0010B	ċ
cedil;	U+000B8	¸
cedil	U+000B8	¸
Cedilla;	U+000B8	¸
cemptyv;	U+029B2	⦲
cent;	U+000A2	¢
cent	U+000A2	¢
CenterDot;	U+000B7	·
centerdot;	U+000B7	·

Cfr;	U+0212D	ℭ
cfr;	U+1D520	𝔠
CHcy;	U+00427	Ч
chcy;	U+00447	ч
check;	U+02713	✓
checkmark;	U+02713	✓
Chi;	U+003A7	Χ
chi;	U+003C7	χ
cir;	U+025CB	○
circ;	U+002C6	ˆ
circeq;	U+02257	≗
circlearrowleft;	U+021BA	↺
circlearrowright;	U+021BB	↻
circledast;	U+0229B	⊛
circledcirc;	U+0229A	⊚
circleddash;	U+0229D	⊝
CircleDot;	U+02299	⊙
circledR;	U+000AE	®
circledS;	U+024C8	Ⓢ
CircleMinus;	U+02296	⊖
CirclePlus;	U+02295	⊕
CircleTimes;	U+02297	⊗
cirE;	U+029C3	⧃
cire;	U+02257	≗
cirfnint;	U+02A10	⨐
cirmid;	U+02AEF	⫯
cirscir;	U+029C2	⧂
ClockwiseContourIntegral;	U+02232	∲
CloseCurlyDoubleQuote;	U+0201D	”
CloseCurlyQuote;	U+02019	’
clubs;	U+02663	♣
clubsuit;	U+02663	♣
Colon;	U+02237	∷
colon;	U+0003A	:
Colone;	U+02A74	⩴
colone;	U+02254	≔
coloneq;	U+02254	≔
comma;	U+0002C	,
commat;	U+00040	@
comp;	U+02201	∁
compfn;	U+02218	∘
complement;	U+02201	∁
complexes;	U+02102	ℂ
cong;	U+02245	≅
congdot;	U+02A6D	⩭
Congruent;	U+02261	≡
Conint;	U+0222F	∯
conint;	U+0222E	∮
ContourIntegral;	U+0222E	∮
Copf;	U+02102	ℂ
copf;	U+1D554	𝕔
coprod;	U+02210	∐
Coproduct;	U+02210	∐
COPY;	U+000A9	©
COPY	U+000A9	©
copy;	U+000A9	©
copy	U+000A9	©
copysr;	U+02117	℗
CounterClockwiseContourIntegral;	U+02233	∳
crarr;	U+021B5	↵
Cross;	U+02A2F	×
cross;	U+02717	✗
Cscr;	U+1D49E	𝒞

cscr;	U+1D4B8	𝒸
csub;	U+02ACF	⫏
csube;	U+02AD1	⫑
csup;	U+02AD0	⫐
csupe;	U+02AD2	⫒
ctdot;	U+022EF	⋯
cudarrl;	U+02938	⤸
cudarrr;	U+02935	⤵
cuepr;	U+022DE	⋞
cuesc;	U+022DF	⋟
cularr;	U+021B6	↶
cularrp;	U+0293D	⤽
Cup;	U+022D3	⋓
cup;	U+0222A	∪
cupbrcap;	U+02A48	⩈
CupCap;	U+0224D	≍
cupcap;	U+02A46	⩆
cupcup;	U+02A4A	⩊
cupdot;	U+0228D	⊍
cupor;	U+02A45	⩅
cups;	U+0222A U+0FE00	∪
curarr;	U+021B7	↷
curarrm;	U+0293C	⤼
curlyeqprec;	U+022DE	⋞
curlyeqsucc;	U+022DF	⋟
curlyvee;	U+022CE	⋎
curlywedge;	U+022CF	⋏
curren;	U+000A4	¤
curren	U+000A4	¤
curvearrowleft;	U+021B6	↶
curvearrowright;	U+021B7	↷
cuvee;	U+022CE	⋎
cuwed;	U+022CF	⋏
cwconint;	U+02232	∲
cwint;	U+02231	∱
cylcty;	U+0232D	⌭
Dagger;	U+02021	‡
dagger;	U+02020	†
daleth;	U+02138	ℸ
Darr;	U+021A1	↡
dArr;	U+021D3	⇓
darr;	U+02193	↓
dash;	U+02010	‐
Dashv;	U+02AE4	⫤
dashv;	U+022A3	⊣
dbkarow;	U+0290F	⤏
dblac;	U+002DD	˝
Dcaron;	U+0010E	Ď
dcaron;	U+0010F	ď
Dcy;	U+00414	Д
dcy;	U+00434	д
DD;	U+02145	ⅅ
dd;	U+02146	ⅆ
ddagger;	U+02021	‡
ddarr;	U+021CA	⇊
DDotrahd;	U+02911	⤑
ddotseq;	U+02A77	⩷
deg;	U+000B0	°
deg	U+000B0	°
Del;	U+02207	∇
Delta;	U+00394	Δ
delta;	U+003B4	δ
demptyv;	U+029B1	⦱
dfisht;	U+0297F	⥿

dfisht;	U+0297F	ɿ
Dfr;	U+1D507	𝔇
dfr;	U+1D521	𝔡
dHar;	U+02965	⥥
dharl;	U+021C3	⇃
dharr;	U+021C2	⇂
DiacriticalAcute;	U+000B4	´
DiacriticalDot;	U+002D9	˙
DiacriticalDoubleAcute;	U+002DD	˝
DiacriticalGrave;	U+00060	`
DiacriticalTilde;	U+002DC	˜
diam;	U+022C4	⋄
Diamond;	U+022C4	⋄
diamond;	U+022C4	⋄
diamondsuit;	U+02666	♦
diams;	U+02666	♦
die;	U+000A8	¨
DifferentialD;	U+02146	ⅆ
digamma;	U+003DD	ϝ
disin;	U+022F2	⋲
div;	U+000F7	÷
divide;	U+000F7	÷
divide	U+000F7	÷
divideontimes;	U+022C7	⋇
divonx;	U+022C7	⋇
DJcy;	U+00402	Ђ
djcy;	U+00452	ђ
dlcorn;	U+0231E	⌞
dlcrop;	U+0230D	⌍
dollar;	U+00024	$
Dopf;	U+1D53B	𝔻
dopf;	U+1D555	𝕕
Dot;	U+000A8	¨
dot;	U+002D9	˙
DotDot;	U+020DC	◌⃜
doteq;	U+02250	≐
doteqdot;	U+02251	≑
DotEqual;	U+02250	≐
dotminus;	U+02238	∸
dotplus;	U+02214	∔
dotsquare;	U+022A1	⊡
doublebarwedge;	U+02306	⌆
DoubleContourIntegral;	U+0222F	∯
DoubleDot;	U+000A8	¨
DoubleDownArrow;	U+021D3	⇓
DoubleLeftArrow;	U+021D0	⇐
DoubleLeftRightArrow;	U+021D4	⇔
DoubleLeftTee;	U+02AE4	⫤
DoubleLongLeftArrow;	U+027F8	⟸
DoubleLongLeftRightArrow;	U+027FA	⟺
DoubleLongRightArrow;	U+027F9	⟹
DoubleRightArrow;	U+021D2	⇒
DoubleRightTee;	U+022A8	⊨
DoubleUpArrow;	U+021D1	⇑
DoubleUpDownArrow;	U+021D5	⇕
DoubleVerticalBar;	U+02225	∥
DownArrow;	U+02193	↓
Downarrow;	U+021D3	⇓
downarrow;	U+02193	↓
DownArrowBar;	U+02913	⤓
DownArrowUpArrow;	U+021F5	⇵
DownBreve;	U+00311	◌̑
downdownarrows;	U+021CA	⇊
[illegible]	[illegible]	[illegible]

downharpoonleft;	U+021C3	↓
downharpoonright;	U+021C2	⇂
DownLeftRightVector;	U+02950	⥑
DownLeftTeeVector;	U+0295E	⥞
DownLeftVector;	U+021BD	↽
DownLeftVectorBar;	U+02956	⥖
DownRightTeeVector;	U+0295F	⥟
DownRightVector;	U+021C1	⇁
DownRightVectorBar;	U+02957	⥗
DownTee;	U+022A4	⊤
DownTeeArrow;	U+021A7	↧
drbkarow;	U+02910	⤐
drcorn;	U+0231F	⌟
drcrop;	U+0230C	⌌
Dscr;	U+1D49F	𝒟
dscr;	U+1D4B9	𝒹
DScy;	U+00405	Ѕ
dscy;	U+00455	ѕ
dsol;	U+029F6	⧶
Dstrok;	U+00110	Đ
dstrok;	U+00111	đ
dtdot;	U+022F1	⋱
dtri;	U+025BF	▿
dtrif;	U+025BE	▾
duarr;	U+021F5	⇵
duhar;	U+0296F	⥯
dwangle;	U+029A6	⦦
DZcy;	U+0040F	Џ
dzcy;	U+0045F	џ
dzigrarr;	U+027FF	⟿
Eacute;	U+000C9	É
Eacute	U+000C9	É
eacute;	U+000E9	é
eacute	U+000E9	é
easter;	U+02A6E	⩮
Ecaron;	U+0011A	Ě
ecaron;	U+0011B	ě
ecir;	U+02256	≖
Ecirc;	U+000CA	Ê
Ecirc	U+000CA	Ê
ecirc;	U+000EA	ê
ecirc	U+000EA	ê
ecolon;	U+02255	≕
Ecy;	U+0042D	Э
ecy;	U+0044D	э
eDDot;	U+02A77	⩷
Edot;	U+00116	Ė
eDot;	U+02251	≑
edot;	U+00117	ė
ee;	U+02147	ⅇ
efDot;	U+02252	≒
Efr;	U+1D508	𝔈
efr;	U+1D522	𝔢
eg;	U+02A9A	⪚
Egrave;	U+000C8	È
Egrave	U+000C8	È
egrave;	U+000E8	è
egrave	U+000E8	è
egs;	U+02A96	⪖
egsdot;	U+02A98	⪘
el;	U+02A99	⪙
Element;	U+02208	∈
elinters;	U+023E7	⏧
ell;	U+02113	ℓ
els;	U+02A95	⪕

elsdot;	U+02A97	⪗
Emacr;	U+00112	Ē
emacr;	U+00113	ē
empty;	U+02205	∅
emptyset;	U+02205	∅
EmptySmallSquare;	U+025FB	□
emptyv;	U+02205	∅
EmptyVerySmallSquare;	U+025AB	▫
emsp;	U+02003	
emsp13;	U+02004	
emsp14;	U+02005	
ENG;	U+0014A	Ŋ
eng;	U+0014B	ŋ
ensp;	U+02002	
Eogon;	U+00118	Ę
eogon;	U+00119	ę
Eopf;	U+1D53C	𝔼
eopf;	U+1D556	𝕖
epar;	U+022D5	⋕
eparsl;	U+029E3	⧣
eplus;	U+02A71	⩱
epsi;	U+003B5	ε
Epsilon;	U+00395	Ε
epsilon;	U+003B5	ε
epsiv;	U+003F5	ϵ
eqcirc;	U+02256	≖
eqcolon;	U+02255	≕
eqsim;	U+02242	≂
eqslantgtr;	U+02A96	⪖
eqslantless;	U+02A95	⪕
Equal;	U+02A75	⩵
equals;	U+0003D	=
EqualTilde;	U+02242	≂
equest;	U+0225F	≟
Equilibrium;	U+021CC	⇌
equiv;	U+02261	≡
equivDD;	U+02A78	⩸
eqvparsl;	U+029E5	⧥
erarr;	U+02971	⥱
erDot;	U+02253	≓
Escr;	U+02130	ℰ
escr;	U+0212F	ℯ
esdot;	U+02250	≐
Esim;	U+02A73	⩳
esim;	U+02242	≂
Eta;	U+00397	Η
eta;	U+003B7	η
ETH;	U+000D0	Ð
ETH	U+000D0	Ð
eth;	U+000F0	ð
eth	U+000F0	ð
Euml;	U+000CB	Ë
Euml	U+000CB	Ë
euml;	U+000EB	ë
euml	U+000EB	ë
euro;	U+020AC	€
excl;	U+00021	!
exist;	U+02203	∃
Exists;	U+02203	∃
expectation;	U+02130	ℰ
ExponentialE;	U+02147	ⅇ
exponentiale;	U+02147	ⅇ
fallingdotseq;	U+02252	≒

Fcy;	U+00424	Ф
fcy;	U+00444	ф
female;	U+02640	♀
ffilig;	U+0FB03	ffi
fflig;	U+0FB00	ff
ffllig;	U+0FB04	ffl
Ffr;	U+1D509	𝔉
ffr;	U+1D523	𝔣
filig;	U+0FB01	fi
FilledSmallSquare;	U+025FC	◼
FilledVerySmallSquare;	U+025AA	▪
fjlig;	U+00066 U+0006A	fj
flat;	U+0266D	♭
fllig;	U+0FB02	fl
fltns;	U+025B1	▱
fnof;	U+00192	ƒ
Fopf;	U+1D53D	𝔽
fopf;	U+1D557	𝕗
ForAll;	U+02200	∀
forall;	U+02200	∀
fork;	U+022D4	⋔
forkv;	U+02AD9	⫙
Fouriertrf;	U+02131	ℱ
fpartint;	U+02A0D	⨍
frac12;	U+000BD	½
frac12	U+000BD	½
frac13;	U+02153	⅓
frac14;	U+000BC	¼
frac14	U+000BC	¼
frac15;	U+02155	⅕
frac16;	U+02159	⅙
frac18;	U+0215B	⅛
frac23;	U+02154	⅔
frac25;	U+02156	⅖
frac34;	U+000BE	¾
frac34	U+000BE	¾
frac35;	U+02157	⅗
frac38;	U+0215C	⅜
frac45;	U+02158	⅘
frac56;	U+0215A	⅚
frac58;	U+0215D	⅝
frac78;	U+0215E	⅞
frasl;	U+02044	⁄
frown;	U+02322	⌢
Fscr;	U+02131	ℱ
fscr;	U+1D4BB	𝒻
gacute;	U+001F5	ǵ
Gamma;	U+00393	Γ
gamma;	U+003B3	γ
Gammad;	U+003DC	Ϝ
gammad;	U+003DD	ϝ
gap;	U+02A86	⪆
Gbreve;	U+0011E	Ğ
gbreve;	U+0011F	ğ
Gcedil;	U+00122	Ģ
Gcirc;	U+0011C	Ĝ
gcirc;	U+0011D	ĝ
Gcy;	U+00413	Г
gcy;	U+00433	г
Gdot;	U+00120	Ġ
gdot;	U+00121	ġ
gE;	U+02267	≧
ge;	U+02265	≥
gEl;	U+02A8C	⪌
gel;	U+022DB	⋛
geq;	U+02265	≥

geqq;	U+02267	≧
geqslant;	U+02A7E	⩾
ges;	U+02A7E	⩾
gescc;	U+02AA9	⪩
gesdot;	U+02A80	⪀
gesdoto;	U+02A82	⪂
gesdotol;	U+02A84	⪄
gesl;	U+022DB U+0FE00	⋛
gesles;	U+02A94	⪔
Gfr;	U+1D50A	𝔊
gfr;	U+1D524	𝔤
Gg;	U+022D9	⋙
gg;	U+0226B	≫
ggg;	U+022D9	⋙
gimel;	U+02137	ℷ
GJcy;	U+00403	Ѓ
gjcy;	U+00453	ѓ
gl;	U+02277	≷
gla;	U+02AA5	⪥
glE;	U+02A92	⪒
glj;	U+02AA4	⪤
gnap;	U+02A8A	⪊
gnapprox;	U+02A8A	⪊
gnE;	U+02269	≩
gne;	U+02A88	⪈
gneq;	U+02A88	⪈
gneqq;	U+02269	≩
gnsim;	U+022E7	⋧
Gopf;	U+1D53E	𝔾
gopf;	U+1D558	𝕘
grave;	U+00060	`
GreaterEqual;	U+02265	≥
GreaterEqualLess;	U+022DB	⋛
GreaterFullEqual;	U+02267	≧
GreaterGreater;	U+02AA2	⪢
GreaterLess;	U+02277	≷
GreaterSlantEqual;	U+02A7E	⩾
GreaterTilde;	U+02273	≳
Gscr;	U+1D4A2	𝒢
gscr;	U+0210A	ℊ
gsim;	U+02273	≳
gsime;	U+02A8E	⪎
gsiml;	U+02A90	⪐
GT;	U+0003E	>
GT	U+0003E	>
Gt;	U+0226B	≫
gt;	U+0003E	>
gt	U+0003E	>
gtcc;	U+02AA7	⪧
gtcir;	U+02A7A	⩺
gtdot;	U+022D7	⋗
gtlPar;	U+02995	⦕
gtquest;	U+02A7C	⩼
gtrapprox;	U+02A86	⪆
gtrarr;	U+02978	⥸
gtrdot;	U+022D7	⋗
gtreqless;	U+022DB	⋛
gtreqqless;	U+02A8C	⪌
gtrless;	U+02277	≷
gtrsim;	U+02273	≳
gvertneqq;	U+02269 U+0FE00	≩

gvnE;	U+02269 U+0FE00	≩
Hacek;	U+002C7	ˇ
hairsp;	U+0200A	
half;	U+000BD	½
hamilt;	U+0210B	ℋ
HARDcy;	U+0042A	Ъ
hardcy;	U+0044A	ъ
hArr;	U+021D4	⇔
harr;	U+02194	↔
harrcir;	U+02948	⥈
harrw;	U+021AD	↭
Hat;	U+0005E	^
hbar;	U+0210F	ℏ
Hcirc;	U+00124	Ĥ
hcirc;	U+00125	ĥ
hearts;	U+02665	♥
heartsuit;	U+02665	♥
hellip;	U+02026	…
hercon;	U+022B9	⊹
Hfr;	U+0210C	ℌ
hfr;	U+1D525	𝔥
HilbertSpace;	U+0210B	ℋ
hksearow;	U+02925	⤥
hkswarow;	U+02926	⤦
hoarr;	U+021FF	⇿
homtht;	U+0223B	∻
hookleftarrow;	U+021A9	↩
hookrightarrow;	U+021AA	↪
Hopf;	U+0210D	ℍ
hopf;	U+1D559	𝕙
horbar;	U+02015	―
HorizontalLine;	U+02500	─
Hscr;	U+0210B	ℋ
hscr;	U+1D4BD	𝒽
hslash;	U+0210F	ℏ
Hstrok;	U+00126	Ħ
hstrok;	U+00127	ħ
HumpDownHump;	U+0224E	≎
HumpEqual;	U+0224F	≏
hybull;	U+02043	⁃
hyphen;	U+02010	‐
Iacute;	U+000CD	Í
Iacute	U+000CD	Í
iacute;	U+000ED	í
iacute	U+000ED	í
ic;	U+02063	
Icirc;	U+000CE	Î
Icirc	U+000CE	Î
icirc;	U+000EE	î
icirc	U+000EE	î
Icy;	U+00418	И
icy;	U+00438	и
Idot;	U+00130	İ
IEcy;	U+00415	Е
iecy;	U+00435	е
iexcl;	U+000A1	¡
iexcl	U+000A1	¡
iff;	U+021D4	⇔
Ifr;	U+02111	ℑ
ifr;	U+1D526	𝔦
Igrave;	U+000CC	Ì
Igrave	U+000CC	Ì
igrave;	U+000EC	ì
igrave	U+000EC	ì
ii;	U+02148	ⅈ

iiiint;	U+02A0C	⨌
iiint;	U+0222D	∭
iinfin;	U+029DC	⧜
iiota;	U+02129	℩
IJlig;	U+00132	Ĳ
ijlig;	U+00133	ĳ
Im;	U+02111	ℑ
Imacr;	U+0012A	Ī
imacr;	U+0012B	ī
image;	U+02111	ℑ
ImaginaryI;	U+02148	ⅈ
imagline;	U+02110	ℐ
imagpart;	U+02111	ℑ
imath;	U+00131	ı
imof;	U+022B7	⊷
imped;	U+001B5	Ƶ
Implies;	U+021D2	⇒
in;	U+02208	∈
incare;	U+02105	℅
infin;	U+0221E	∞
infintie;	U+029DD	⧝
inodot;	U+00131	ı
Int;	U+0222C	∬
int;	U+0222B	∫
intcal;	U+022BA	⊺
integers;	U+02124	ℤ
Integral;	U+0222B	∫
intercal;	U+022BA	⊺
Intersection;	U+022C2	∩
intlarhk;	U+02A17	⨗
intprod;	U+02A3C	⨼
InvisibleComma;	U+02063	
InvisibleTimes;	U+02062	
IOcy;	U+00401	Ё
iocy;	U+00451	ё
Iogon;	U+0012E	Į
iogon;	U+0012F	į
Iopf;	U+1D540	𝕀
iopf;	U+1D55A	𝕚
Iota;	U+00399	Ι
iota;	U+003B9	ι
iprod;	U+02A3C	⨼
iquest;	U+000BF	¿
iquest	U+000BF	¿
Iscr;	U+02110	ℐ
iscr;	U+1D4BE	𝒾
isin;	U+02208	∈
isindot;	U+022F5	⋵
isinE;	U+022F9	⋹
isins;	U+022F4	⋴
isinsv;	U+022F3	⋳
isinv;	U+02208	∈
it;	U+02062	
Itilde;	U+00128	Ĩ
itilde;	U+00129	ĩ
Iukcy;	U+00406	І
iukcy;	U+00456	і
Iuml;	U+000CF	Ï
Iuml	U+000CF	Ï
iuml;	U+000EF	ï
iuml	U+000EF	ï
Jcirc;	U+00134	Ĵ
jcirc;	U+00135	ĵ
Jcy;	U+00419	Й

jcy;	U+00439	и
Jfr;	U+1D50D	𝔍
jfr;	U+1D527	𝔧
jmath;	U+00237	ȷ
Jopf;	U+1D541	𝕁
jopf;	U+1D55B	𝕛
Jscr;	U+1D4A5	𝒥
jscr;	U+1D4BF	𝒿
Jsercy;	U+00408	Ј
jsercy;	U+00458	ј
Jukcy;	U+00404	Є
jukcy;	U+00454	є
Kappa;	U+0039A	Κ
kappa;	U+003BA	κ
kappav;	U+003F0	ϰ
Kcedil;	U+00136	Ķ
kcedil;	U+00137	ķ
Kcy;	U+0041A	К
kcy;	U+0043A	к
Kfr;	U+1D50E	𝔎
kfr;	U+1D528	𝔨
kgreen;	U+00138	ĸ
KHcy;	U+00425	Х
khcy;	U+00445	х
KJcy;	U+0040C	Ќ
kjcy;	U+0045C	ќ
Kopf;	U+1D542	𝕂
kopf;	U+1D55C	𝕜
Kscr;	U+1D4A6	𝒦
kscr;	U+1D4C0	𝓀
lAarr;	U+021DA	⇚
Lacute;	U+00139	Ĺ
lacute;	U+0013A	ĺ
laemptyv;	U+029B4	⦴
lagran;	U+02112	ℒ
Lambda;	U+0039B	Λ
lambda;	U+003BB	λ
Lang;	U+027EA	⟪
lang;	U+027E8	⟨
langd;	U+02991	⦑
langle;	U+027E8	⟨
lap;	U+02A85	⪅
Laplacetrf;	U+02112	ℒ
laquo;	U+000AB	«
laquo	U+000AB	«
Larr;	U+0219E	↞
lArr;	U+021D0	⇐
larr;	U+02190	←
larrb;	U+021E4	⇤
larrbfs;	U+0291F	⤟
larrfs;	U+0291D	⤝
larrhk;	U+021A9	↩
larrlp;	U+021AB	↫
larrpl;	U+02939	⤹
larrsim;	U+02973	⥳
larrtl;	U+021A2	↢
lat;	U+02AAB	⪫
lAtail;	U+0291B	⤛
latail;	U+02919	⤙
late;	U+02AAD	⪭
lates;	U+02AAD U+0FE00	⪭
lBarr;	U+0290E	⤎
lbarr;	U+0290C	⤌
lbbrk;	U+02772	❲
lbrace;	U+0007B	{
lbrack;	U+0005B	[

lbrack;	U+0005B	[
lbrke;	U+0298B	⦋
lbrksld;	U+0298F	⦏
lbrkslu;	U+0298D	⦍
Lcaron;	U+0013D	Ľ
lcaron;	U+0013E	ľ
Lcedil;	U+0013B	Ļ
lcedil;	U+0013C	ļ
lceil;	U+02308	⌈
lcub;	U+0007B	{
Lcy;	U+0041B	Л
lcy;	U+0043B	л
ldca;	U+02936	⤶
ldquo;	U+0201C	“
ldquor;	U+0201E	„
ldrdhar;	U+02967	⥧
ldrushar;	U+0294B	⥋
ldsh;	U+021B2	↲
lE;	U+02266	≦
le;	U+02264	≤
LeftAngleBracket;	U+027E8	⟨
LeftArrow;	U+02190	←
Leftarrow;	U+021D0	⇐
leftarrow;	U+02190	←
LeftArrowBar;	U+021E4	⇤
LeftArrowRightArrow;	U+021C6	⇆
leftarrowtail;	U+021A2	↢
LeftCeiling;	U+02308	⌈
LeftDoubleBracket;	U+027E6	⟦
LeftDownTeeVector;	U+02961	⥡
LeftDownVector;	U+021C3	⇃
LeftDownVectorBar;	U+02959	⥙
LeftFloor;	U+0230A	⌊
leftharpoondown;	U+021BD	↽
leftharpoonup;	U+021BC	↼
leftleftarrows;	U+021C7	⇇
LeftRightArrow;	U+02194	↔
Leftrightarrow;	U+021D4	⇔
leftrightarrow;	U+02194	↔
leftrightarrows;	U+021C6	⇆
leftrightharpoons;	U+021CB	⇋
leftrightsquigarrow;	U+021AD	↭
LeftRightVector;	U+0294E	⥎
LeftTee;	U+022A3	⊣
LeftTeeArrow;	U+021A4	↤
LeftTeeVector;	U+0295A	⥚
leftthreetimes;	U+022CB	⋋
LeftTriangle;	U+022B2	◁
LeftTriangleBar;	U+029CF	⧏
LeftTriangleEqual;	U+022B4	⊴
LeftUpDownVector;	U+02951	⥑
LeftUpTeeVector;	U+02960	⥠
LeftUpVector;	U+021BF	↿
LeftUpVectorBar;	U+02958	⥘
LeftVector;	U+021BC	↼
LeftVectorBar;	U+02952	⥒
lEg;	U+02A8B	⪋
leg;	U+022DA	⋚
leq;	U+02264	≤
leqq;	U+02266	≦
leqslant;	U+02A7D	⩽
les;	U+02A7D	⩽
lescc;	U+02AA8	⪨
lesdot;	U+02A7F	⩿

lesdoto;	U+02A81	⪁
lesdotor;	U+02A83	⪃
lesg;	U+022DA U+0FE00	⋚
lesges;	U+02A93	⪓
lessapprox;	U+02A85	⪅
lessdot;	U+022D6	⋖
lesseqgtr;	U+022DA	⋚
lesseqqgtr;	U+02A8B	⪋
LessEqualGreater;	U+022DA	⋚
LessFullEqual;	U+02266	≦
LessGreater;	U+02276	≶
lessgtr;	U+02276	≶
LessLess;	U+02AA1	⪡
lesssim;	U+02272	≲
LessSlantEqual;	U+02A7D	⩽
LessTilde;	U+02272	≲
lfisht;	U+0297C	⥼
lfloor;	U+0230A	⌊
Lfr;	U+1D50F	𝔏
lfr;	U+1D529	𝔩
lg;	U+02276	≶
lgE;	U+02A91	⪑
lHar;	U+02962	⥢
lhard;	U+021BD	↽
lharu;	U+021BC	↼
lharul;	U+0296A	⥪
lhblk;	U+02584	▄
LJcy;	U+00409	Љ
ljcy;	U+00459	љ
Ll;	U+022D8	⋘
ll;	U+0226A	≪
llarr;	U+021C7	⇇
llcorner;	U+0231E	⌞
Lleftarrow;	U+021DA	⇚
llhard;	U+0296B	⥫
lltri;	U+025FA	◺
Lmidot;	U+0013F	Ŀ
lmidot;	U+00140	ŀ
lmoust;	U+023B0	⎰
lmoustache;	U+023B0	⎰
lnap;	U+02A89	⪉
lnapprox;	U+02A89	⪉
lnE;	U+02268	≨
lne;	U+02A87	⪇
lneq;	U+02A87	⪇
lneqq;	U+02268	≨
lnsim;	U+022E6	⋦
loang;	U+027EC	⟬
loarr;	U+021FD	⇽
lobrk;	U+027E6	⟦
LongLeftArrow;	U+027F5	⟵
Longleftarrow;	U+027F8	⟸
longleftarrow;	U+027F5	⟵
LongLeftRightArrow;	U+027F7	⟷
Longleftrightarrow;	U+027FA	⟺
longleftrightarrow;	U+027F7	⟷
longmapsto;	U+027FC	⟼
LongRightArrow;	U+027F6	⟶
Longrightarrow;	U+027F9	⟹
longrightarrow;	U+027F6	⟶
looparrowleft;	U+021AB	↫
looparrowright;	U+021AC	↬

lopar;	U+02985	⦅
Lopf;	U+1D543	𝕃
lopf;	U+1D55D	𝕝
loplus;	U+02A2D	⨭
lotimes;	U+02A34	⨴
lowast;	U+02217	∗
lowbar;	U+0005F	_
LowerLeftArrow;	U+02199	↙
LowerRightArrow;	U+02198	↘
loz;	U+025CA	◊
lozenge;	U+025CA	◊
lozf;	U+029EB	⧫
lpar;	U+00028	(
lparlt;	U+02993	⦓
lrarr;	U+021C6	⇆
lrcorner;	U+0231F	⌟
lrhar;	U+021CB	⇋
lrhard;	U+0296D	⥭
lrm;	U+0200E	
lrtri;	U+022BF	⊿
lsaquo;	U+02039	‹
Lscr;	U+02112	ℒ
lscr;	U+1D4C1	𝓁
Lsh;	U+021B0	↰
lsh;	U+021B0	↰
lsim;	U+02272	≲
lsime;	U+02A8D	⪍
lsimg;	U+02A8F	⪏
lsqb;	U+0005B	[
lsquo;	U+02018	‘
lsquor;	U+0201A	‚
Lstrok;	U+00141	Ł
lstrok;	U+00142	ł
LT;	U+0003C	<
LT	U+0003C	<
Lt;	U+0226A	≪
lt;	U+0003C	<
lt	U+0003C	<
ltcc;	U+02AA6	⪦
ltcir;	U+02A79	⩹
ltdot;	U+022D6	⋖
lthree;	U+022CB	⋋
ltimes;	U+022C9	⋉
ltlarr;	U+02976	⥶
ltquest;	U+02A7B	⩻
ltri;	U+025C3	◃
ltrie;	U+022B4	⊴
ltrif;	U+025C2	◂
ltrPar;	U+02996	⦖
lurdshar;	U+0294A	⥊
luruhar;	U+02966	⥦
lvertneqq;	U+02268 U+0FE00	≨
lvnE;	U+02268 U+0FE00	≨
macr;	U+000AF	¯
macr	U+000AF	¯
male;	U+02642	♂
malt;	U+02720	✠
maltese;	U+02720	✠
Map;	U+02905	⤅
map;	U+021A6	↦
mapsto;	U+021A6	↦
mapstodown;	U+021A7	↧
mapstoleft;	U+021A4	↤

mapstoup;	U+021A5	↥
marker;	U+025AE	▮
mcomma;	U+02A29	⨩
Mcy;	U+0041C	М
mcy;	U+0043C	м
mdash;	U+02014	—
mDDot;	U+0223A	∺
measuredangle;	U+02221	∡
MediumSpace;	U+0205F	
Mellintrf;	U+02133	ℳ
Mfr;	U+1D510	𝔐
mfr;	U+1D52A	𝔪
mho;	U+02127	℧
micro;	U+000B5	µ
micro	U+000B5	µ
mid;	U+02223	∣
midast;	U+0002A	*
midcir;	U+02AF0	⫰
middot;	U+000B7	·
middot	U+000B7	·
minus;	U+02212	−
minusb;	U+0229F	⊟
minusd;	U+02238	∸
minusdu;	U+02A2A	⨪
MinusPlus;	U+02213	∓
mlcp;	U+02ADB	⫛
mldr;	U+02026	…
mnplus;	U+02213	∓
models;	U+022A7	⊧
Mopf;	U+1D544	𝕄
mopf;	U+1D55E	𝕞
mp;	U+02213	∓
Mscr;	U+02133	ℳ
mscr;	U+1D4C2	𝓂
mstpos;	U+0223E	∾
Mu;	U+0039C	Μ
mu;	U+003BC	μ
multimap;	U+022B8	⊸
mumap;	U+022B8	⊸
nabla;	U+02207	∇
Nacute;	U+00143	Ń
nacute;	U+00144	ń
nang;	U+02220 U+020D2	∠⃒
nap;	U+02249	≉
napE;	U+02A70 U+00338	⩰̸
napid;	U+0224B U+00338	≋̸
napos;	U+00149	ŉ
napprox;	U+02249	≉
natur;	U+0266E	♮
natural;	U+0266E	♮
naturals;	U+02115	ℕ
nbsp;	U+000A0	
nbsp	U+000A0	
nbump;	U+0224E U+00338	≎̸
nbumpe;	U+0224F U+00338	≏̸
ncap;	U+02A43	⩃
Ncaron;	U+00147	Ň
ncaron;	U+00148	ň
Ncedil;	U+00145	Ņ
ncedil;	U+00146	ņ
ncong;	U+02247	≇
ncongdot;	U+02A6D U+00338	⩭̸
ncup;	U+02A42	⩂

Ncy;	U+0041D	Н
ncy;	U+0043D	н
ndash;	U+02013	–
ne;	U+02260	≠
nearhk;	U+02924	⤤
neArr;	U+021D7	⇗
nearr;	U+02197	↗
nearrow;	U+02197	↗
nedot;	U+02250 U+00338	≠
NegativeMediumSpace;	U+0200B	
NegativeThickSpace;	U+0200B	
NegativeThinSpace;	U+0200B	
NegativeVeryThinSpace;	U+0200B	
nequiv;	U+02262	≢
nesear;	U+02928	⤨
nesim;	U+02242 U+00338	≠
NestedGreaterGreater;	U+0226B	≫
NestedLessLess;	U+0226A	≪
NewLine;	U+0000A	␊
nexist;	U+02204	∄
nexists;	U+02204	∄
Nfr;	U+1D511	𝔑
nfr;	U+1D52B	𝔫
ngE;	U+02267 U+00338	≧
nge;	U+02271	≱
ngeq;	U+02271	≱
ngeqq;	U+02267 U+00338	≧
ngeqslant;	U+02A7E U+00338	⩾
nges;	U+02A7E U+00338	⩾
nGg;	U+022D9 U+00338	⋙
ngsim;	U+02275	≵
nGt;	U+0226B U+020D2	≫
ngt;	U+0226F	≯
ngtr;	U+0226F	≯
nGtv;	U+0226B U+00338	≫
nhArr;	U+021CE	⇎
nharr;	U+021AE	↮
nhpar;	U+02AF2	⫲
ni;	U+0220B	∋
nis;	U+022FC	⋼
nisd;	U+022FA	⋺
niv;	U+0220B	∋
NJcy;	U+0040A	Њ
njcy;	U+0045A	њ
nlArr;	U+021CD	⇍
nlarr;	U+0219A	↚
nldr;	U+02025	..
nlE;	U+02266 U+00338	≦
nle;	U+02270	≰
nLeftarrow;	U+021CD	⇍
nleftarrow;	U+0219A	↚
nLeftrightarrow;	U+021CE	⇎
nleftrightarrow;	U+021AE	↮
nleq;	U+02270	≰
nleqq;	U+02266 U+00338	≦
nleqslant;	U+02A7D U+00338	⩽
nles;	U+02A7D U+00338	⩽
nless;	U+0226E	≮
nLl;	U+022D8 U+00338	⋘
nlsim;	U+02274	≴
nLt;	U+0226A U+020D2	≪
nlt;	U+0226E	≮

nltri;	U+022EA	⋪
nltrie;	U+022EC	⋬
nLtv;	U+0226A U+00338	≪̸
nmid;	U+02224	∤
NoBreak;	U+02060	
NonBreakingSpace;	U+000A0	
Nopf;	U+02115	ℕ
nopf;	U+1D55F	𝕟
Not;	U+02AEC	⫬
not;	U+000AC	¬
not	U+000AC	¬
NotCongruent;	U+02262	≢
NotCupCap;	U+0226D	≭
NotDoubleVerticalBar;	U+02226	∦
NotElement;	U+02209	∉
NotEqual;	U+02260	≠
NotEqualTilde;	U+02242 U+00338	≂̸
NotExists;	U+02204	∄
NotGreater;	U+0226F	≯
NotGreaterEqual;	U+02271	≱
NotGreaterFullEqual;	U+02267 U+00338	≧̸
NotGreaterGreater;	U+0226B U+00338	≫̸
NotGreaterLess;	U+02279	≹
NotGreaterSlantEqual;	U+02A7E U+00338	⩾̸
NotGreaterTilde;	U+02275	≵
NotHumpDownHump;	U+0224E U+00338	≎̸
NotHumpEqual;	U+0224F U+00338	≏̸
notin;	U+02209	∉
notindot;	U+022F5 U+00338	⋵̸
notinE;	U+022F9 U+00338	⋹̸
notinva;	U+02209	∉
notinvb;	U+022F7	⋷
notinvc;	U+022F6	⋶
NotLeftTriangle;	U+022EA	⋪
NotLeftTriangleBar;	U+029CF U+00338	⧏̸
NotLeftTriangleEqual;	U+022EC	⋬
NotLess;	U+0226E	≮
NotLessEqual;	U+02270	≰
NotLessGreater;	U+02278	≸
NotLessLess;	U+0226A U+00338	≪̸
NotLessSlantEqual;	U+02A7D U+00338	⩽̸
NotLessTilde;	U+02274	≴
NotNestedGreaterGreater;	U+02AA2 U+00338	⪢̸
NotNestedLessLess;	U+02AA1 U+00338	⪡̸
notni;	U+0220C	∌
notniva;	U+0220C	∌
notnivb;	U+022FE	⋾
notnivc;	U+022FD	⋽
NotPrecedes;	U+02280	⊀
NotPrecedesEqual;	U+02AAF U+00338	⪯̸
NotPrecedesSlantEqual;	U+022E0	⋠
NotReverseElement;	U+0220C	∌
NotRightTriangle;	U+022EB	⋫
NotRightTriangleBar;	U+029D0 U+00338	⧐̸
NotRightTriangleEqual;	U+022ED	⋭
NotSquareSubset;	U+0228F U+00338	⊏̸
NotSquareSubsetEqual;	U+022E2	⋢
NotSquareSuperset;	U+02290 U+00338	⊐̸
NotSquareSupersetEqual;	U+022E3	⋣
NotSubset;	U+02282 U+020D2	⊂⃒

NotSubsetEqual;	U+02288	⊈
NotSucceeds;	U+02281	⊁
NotSucceedsEqual;	U+02AB0 U+00338	⪰̸
NotSucceedsSlantEqual;	U+022E1	⋡
NotSucceedsTilde;	U+0227F U+00338	≿̸
NotSuperset;	U+02283 U+020D2	⊃⃒
NotSupersetEqual;	U+02289	⊉
NotTilde;	U+02241	≁
NotTildeEqual;	U+02244	≄
NotTildeFullEqual;	U+02247	≇
NotTildeTilde;	U+02249	≉
NotVerticalBar;	U+02224	∤
npar;	U+02226	∦
nparallel;	U+02226	∦
nparsl;	U+02AFD U+020E5	⫽⃥
npart;	U+02202 U+00338	∂̸
npolint;	U+02A14	⨔
npr;	U+02280	⊀
nprcue;	U+022E0	⋠
npre;	U+02AAF U+00338	⪯̸
nprec;	U+02280	⊀
npreceq;	U+02AAF U+00338	⪯̸
nrArr;	U+021CF	⇏
nrarr;	U+0219B	↛
nrarrc;	U+02933 U+00338	⤳̸
nrarrw;	U+0219D U+00338	↝̸
nRightarrow;	U+021CF	⇏
nrightarrow;	U+0219B	↛
nrtri;	U+022EB	⋫
nrtrie;	U+022ED	⋭
nsc;	U+02281	⊁
nsccue;	U+022E1	⋡
nsce;	U+02AB0 U+00338	⪰̸
Nscr;	U+1D4A9	𝒩
nscr;	U+1D4C3	𝓃
nshortmid;	U+02224	∤
nshortparallel;	U+02226	∦
nsim;	U+02241	≁
nsime;	U+02244	≄
nsimeq;	U+02244	≄
nsmid;	U+02224	∤
nspar;	U+02226	∦
nsqsube;	U+022E2	⋢
nsqsupe;	U+022E3	⋣
nsub;	U+02284	⊄
nsubE;	U+02AC5 U+00338	⫅̸
nsube;	U+02288	⊈
nsubset;	U+02282 U+020D2	⊂⃒
nsubseteq;	U+02288	⊈
nsubseteqq;	U+02AC5 U+00338	⫅̸
nsucc;	U+02281	⊁
nsucceq;	U+02AB0 U+00338	⪰̸
nsup;	U+02285	⊅
nsupE;	U+02AC6 U+00338	⫆̸
nsupe;	U+02289	⊉
nsupset;	U+02283 U+020D2	⊃⃒
nsupseteq;	U+02289	⊉
nsupseteqq;	U+02AC6 U+00338	⫆̸
ntgl;	U+02279	≹
Ntilde;	U+000D1	Ñ

Ntilde	U+000D1	Ñ
ntilde;	U+000F1	ñ
ntilde	U+000F1	ñ
ntlg;	U+02278	≸
ntriangleleft;	U+022EA	⋪
ntrianglelefteq;	U+022EC	⋬
ntriangleright;	U+022EB	⋫
ntrianglerighteq;	U+022ED	⋭
Nu;	U+0039D	Ν
nu;	U+003BD	ν
num;	U+00023	#
numero;	U+02116	№
numsp;	U+02007	
nvap;	U+0224D U+020D2	≭
nVDash;	U+022AF	⊯
nVdash;	U+022AE	⊮
nvDash;	U+022AD	⊭
nvdash;	U+022AC	⊬
nvge;	U+02265 U+020D2	≥⃒
nvgt;	U+0003E U+020D2	>⃒
nvHarr;	U+02904	⤄
nvinfin;	U+029DE	⧞
nvlArr;	U+02902	⤂
nvle;	U+02264 U+020D2	≤⃒
nvlt;	U+0003C U+020D2	<⃒
nvltrie;	U+022B4 U+020D2	⊴⃒
nvrArr;	U+02903	⤃
nvrtrie;	U+022B5 U+020D2	⊵⃒
nvsim;	U+0223C U+020D2	∼⃒
nwarhk;	U+02923	⤣
nwArr;	U+021D6	⇖
nwarr;	U+02196	↖
nwarrow;	U+02196	↖
nwnear;	U+02927	⤧
Oacute;	U+000D3	Ó
Oacute	U+000D3	Ó
oacute;	U+000F3	ó
oacute	U+000F3	ó
oast;	U+0229B	⊛
ocir;	U+0229A	⊚
Ocirc;	U+000D4	Ô
Ocirc	U+000D4	Ô
ocirc;	U+000F4	ô
ocirc	U+000F4	ô
Ocy;	U+0041E	О
ocy;	U+0043E	о
odash;	U+0229D	⊝
Odblac;	U+00150	Ő
odblac;	U+00151	ő
odiv;	U+02A38	⨸
odot;	U+02299	⊙
odsold;	U+029BC	⦼
OElig;	U+00152	Œ
oelig;	U+00153	œ
ofcir;	U+029BF	⦿
Ofr;	U+1D512	𝔒
ofr;	U+1D52C	𝔬
ogon;	U+002DB	˛
Ograve;	U+000D2	Ò
Ograve	U+000D2	Ò
ograve;	U+000F2	ò
ograve	U+000F2	ò
ogt;	U+029C1	⧁
ohbar;	U+029B5	⦵

ohm;	U+003A9	Ω
oint;	U+0222E	∮
olarr;	U+021BA	↺
olcir;	U+029BE	⦾
olcross;	U+029BB	⦻
oline;	U+0203E	‾
olt;	U+029C0	⧀
Omacr;	U+0014C	Ō
omacr;	U+0014D	ō
Omega;	U+003A9	Ω
omega;	U+003C9	ω
Omicron;	U+0039F	Ο
omicron;	U+003BF	ο
omid;	U+029B6	⦶
ominus;	U+02296	⊖
Oopf;	U+1D546	𝕆
oopf;	U+1D560	𝕠
opar;	U+029B7	⦷
OpenCurlyDoubleQuote;	U+0201C	“
OpenCurlyQuote;	U+02018	‘
operp;	U+029B9	⦹
oplus;	U+02295	⊕
Or;	U+02A54	⩔
or;	U+02228	∨
orarr;	U+021BB	↻
ord;	U+02A5D	⩝
order;	U+02134	ℴ
orderof;	U+02134	ℴ
ordf;	U+000AA	ª
ordf	U+000AA	ª
ordm;	U+000BA	º
ordm	U+000BA	º
origof;	U+022B6	⊶
oror;	U+02A56	⩖
orslope;	U+02A57	⩗
orv;	U+02A5B	⩛
oS;	U+024C8	Ⓢ
Oscr;	U+1D4AA	𝒪
oscr;	U+02134	ℴ
Oslash;	U+000D8	Ø
Oslash	U+000D8	Ø
oslash;	U+000F8	ø
oslash	U+000F8	ø
osol;	U+02298	⊘
Otilde;	U+000D5	Õ
Otilde	U+000D5	Õ
otilde;	U+000F5	õ
otilde	U+000F5	õ
Otimes;	U+02A37	⨷
otimes;	U+02297	⊗
otimesas;	U+02A36	⨶
Ouml;	U+000D6	Ö
Ouml	U+000D6	Ö
ouml;	U+000F6	ö
ouml	U+000F6	ö
ovbar;	U+0233D	⌽
OverBar;	U+0203E	‾
OverBrace;	U+023DE	⏞
OverBracket;	U+023B4	⎴
OverParenthesis;	U+023DC	⏜
par;	U+02225	∥
para;	U+000B6	¶
para	U+000B6	¶
parallel;	U+02225	∥

parsim;	U+02AF3	⫳
parsl;	U+02AFD	⫽
part;	U+02202	∂
PartialD;	U+02202	∂
Pcy;	U+0041F	П
pcy;	U+0043F	п
percnt;	U+00025	%
period;	U+0002E	.
permil;	U+02030	‰
perp;	U+022A5	⊥
pertenk;	U+02031	‱
Pfr;	U+1D513	𝔓
pfr;	U+1D52D	𝔭
Phi;	U+003A6	Φ
phi;	U+003C6	φ
phiv;	U+003D5	ϕ
phmmat;	U+02133	ℳ
phone;	U+0260E	☎
Pi;	U+003A0	Π
pi;	U+003C0	π
pitchfork;	U+022D4	⋔
piv;	U+003D6	ϖ
planck;	U+0210F	ℏ
planckh;	U+0210E	ℎ
plankv;	U+0210F	ℏ
plus;	U+0002B	+
plusacir;	U+02A23	⨣
plusb;	U+0229E	⊞
pluscir;	U+02A22	⨢
plusdo;	U+02214	∔
plusdu;	U+02A25	⨥
pluse;	U+02A72	⩲
PlusMinus;	U+000B1	±
plusmn;	U+000B1	±
plusmn	U+000B1	±
plussim;	U+02A26	⨦
plustwo;	U+02A27	⨧
pm;	U+000B1	±
Poincareplane;	U+0210C	ℌ
pointint;	U+02A15	⨕
Popf;	U+02119	ℙ
popf;	U+1D561	𝕡
pound;	U+000A3	£
pound	U+000A3	£
Pr;	U+02ABB	⪻
pr;	U+0227A	≺
prap;	U+02AB7	⪷
prcue;	U+0227C	≼
prE;	U+02AB3	⪳
pre;	U+02AAF	⪯
prec;	U+0227A	≺
precapprox;	U+02AB7	⪷
preccurlyeq;	U+0227C	≼
Precedes;	U+0227A	≺
PrecedesEqual;	U+02AAF	⪯
PrecedesSlantEqual;	U+0227C	≼
PrecedesTilde;	U+0227E	≾
preceq;	U+02AAF	⪯
precnapprox;	U+02AB9	⪹
precneqq;	U+02AB5	⪵
precnsim;	U+022E8	⋨
precsim;	U+0227E	≾
		″

Prime;	U+02033	″
prime;	U+02032	′
primes;	U+02119	ℙ
prnap;	U+02AB9	⪹
prnE;	U+02AB5	⪵
prnsim;	U+022E8	⋨
prod;	U+0220F	∏
Product;	U+0220F	∏
profalar;	U+0232E	⌮
profline;	U+02312	⌒
profsurf;	U+02313	⌓
prop;	U+0221D	∝
Proportion;	U+02237	∷
Proportional;	U+0221D	∝
propto;	U+0221D	∝
prsim;	U+0227E	≾
prurel;	U+022B0	⊰
Pscr;	U+1D4AB	𝒫
pscr;	U+1D4C5	𝓅
Psi;	U+003A8	Ψ
psi;	U+003C8	ψ
puncsp;	U+02008	
Qfr;	U+1D514	𝔔
qfr;	U+1D52E	𝔮
qint;	U+02A0C	⨌
Qopf;	U+0211A	ℚ
qopf;	U+1D562	𝕢
qprime;	U+02057	⁗
Qscr;	U+1D4AC	𝒬
qscr;	U+1D4C6	𝓆
quaternions;	U+0210D	ℍ
quatint;	U+02A16	⨖
quest;	U+0003F	?
questeq;	U+0225F	≟
QUOT;	U+00022	"
QUOT	U+00022	"
quot;	U+00022	"
quot	U+00022	"
rAarr;	U+021DB	⇛
race;	U+0223D U+00331	∽̱
Racute;	U+00154	Ŕ
racute;	U+00155	ŕ
radic;	U+0221A	√
raemptyv;	U+029B3	⦳
Rang;	U+027EB	⟫
rang;	U+027E9	⟩
rangd;	U+02992	⦒
range;	U+029A5	⦥
rangle;	U+027E9	⟩
raquo;	U+000BB	»
raquo	U+000BB	»
Rarr;	U+021A0	↠
rArr;	U+021D2	⇒
rarr;	U+02192	→
rarrap;	U+02975	⥵
rarrb;	U+021E5	⇥
rarrbfs;	U+02920	⤠
rarrc;	U+02933	⤳
rarrfs;	U+0291E	⤞
rarrhk;	U+021AA	↪
rarrlp;	U+021AC	↬
rarrpl;	U+02945	⥅
rarrsim;	U+02974	⥴
Rarrtl;	U+02916	⤖
rarrtl;	U+021A3	↣

rAarrl;	U+021A0	⤠
rarrw;	U+0219D	↝
rAtail;	U+0291C	⤜
ratail;	U+0291A	↣
ratio;	U+02236	∶
rationals;	U+0211A	ℚ
RBarr;	U+02910	⤐
rBarr;	U+0290F	⤏
rbarr;	U+0290D	⤍
rbbrk;	U+02773	❳
rbrace;	U+0007D	}
rbrack;	U+0005D	]
rbrke;	U+0298C	⦌
rbrksld;	U+0298E	⦎
rbrkslu;	U+02990	⦐
Rcaron;	U+00158	Ř
rcaron;	U+00159	ř
Rcedil;	U+00156	Ŗ
rcedil;	U+00157	ŗ
rceil;	U+02309	⌉
rcub;	U+0007D	}
Rcy;	U+00420	Р
rcy;	U+00440	р
rdca;	U+02937	⤷
rdldhar;	U+02969	⥩
rdquo;	U+0201D	”
rdquor;	U+0201D	”
rdsh;	U+021B3	↳
Re;	U+0211C	ℜ
real;	U+0211C	ℜ
realine;	U+0211B	ℛ
realpart;	U+0211C	ℜ
reals;	U+0211D	ℝ
rect;	U+025AD	▭
REG;	U+000AE	®
REG	U+000AE	®
reg;	U+000AE	®
reg	U+000AE	®
ReverseElement;	U+0220B	∋
ReverseEquilibrium;	U+021CB	⇋
ReverseUpEquilibrium;	U+0296F	⥯
rfisht;	U+0297D	⥽
rfloor;	U+0230B	⌋
Rfr;	U+0211C	ℜ
rfr;	U+1D52F	𝔯
rHar;	U+02964	⥤
rhard;	U+021C1	⇁
rharu;	U+021C0	⇀
rharul;	U+0296C	⥬
Rho;	U+003A1	Ρ
rho;	U+003C1	ρ
rhov;	U+003F1	ϱ
RightAngleBracket;	U+027E9	〉
RightArrow;	U+02192	→
Rightarrow;	U+021D2	⇒
rightarrow;	U+02192	→
RightArrowBar;	U+021E5	⇥
RightArrowLeftArrow;	U+021C4	⇄
rightarrowtail;	U+021A3	↣
RightCeiling;	U+02309	⌉
RightDoubleBracket;	U+027E7	⟧
RightDownTeeVector;	U+0295D	⥝
RightDownVector;	U+021C2	⇂
RightDownVectorBar;	U+02955	⥕
RightFloor;	U+0230B	⌋

rightharpoondown;	U+021C1	⇁
rightharpoonup;	U+021C0	⇀
rightleftarrows;	U+021C4	⇄
rightleftharpoons;	U+021CC	⇌
rightrightarrows;	U+021C9	⇉
rightsquigarrow;	U+0219D	↝
RightTee;	U+022A2	⊢
RightTeeArrow;	U+021A6	↦
RightTeeVector;	U+0295B	⥛
rightthreetimes;	U+022CC	⋌
RightTriangle;	U+022B3	⊳
RightTriangleBar;	U+029D0	⧐
RightTriangleEqual;	U+022B5	⊵
RightUpDownVector;	U+0294F	⥏
RightUpTeeVector;	U+0295C	⥜
RightUpVector;	U+021BE	↾
RightUpVectorBar;	U+02954	⥔
RightVector;	U+021C0	⇀
RightVectorBar;	U+02953	⥓
ring;	U+002DA	˚
risingdotseq;	U+02253	≓
rlarr;	U+021C4	⇄
rlhar;	U+021CC	⇌
rlm;	U+0200F	‏
rmoust;	U+023B1	⎱
rmoustache;	U+023B1	⎱
rnmid;	U+02AEE	⫮
roang;	U+027ED	⟭
roarr;	U+021FE	⇾
robrk;	U+027E7	⟧
ropar;	U+02986	⦆
Ropf;	U+0211D	ℝ
ropf;	U+1D563	𝕣
roplus;	U+02A2E	⨮
rotimes;	U+02A35	⨵
RoundImplies;	U+02970	⥰
rpar;	U+00029	)
rpargt;	U+02994	⦔
rppolint;	U+02A12	⨒
rrarr;	U+021C9	⇉
Rrightarrow;	U+021DB	⇛
rsaquo;	U+0203A	›
Rscr;	U+0211B	ℛ
rscr;	U+1D4C7	𝓇
Rsh;	U+021B1	↱
rsh;	U+021B1	↱
rsqb;	U+0005D	]
rsquo;	U+02019	’
rsquor;	U+02019	’
rthree;	U+022CC	⋌
rtimes;	U+022CA	⋊
rtri;	U+025B9	▹
rtrie;	U+022B5	⊵
rtrif;	U+025B8	▸
rtriltri;	U+029CE	⧎
RuleDelayed;	U+029F4	⧴
ruluhar;	U+02968	⥨
rx;	U+0211E	℞
Sacute;	U+0015A	Ś
sacute;	U+0015B	ś
sbquo;	U+0201A	‚
Sc;	U+02ABC	≻

sc;	U+0227B	≻
scap;	U+02AB8	⪸
Scaron;	U+00160	Š
scaron;	U+00161	š
sccue;	U+0227D	≽
scE;	U+02AB4	⪴
sce;	U+02AB0	⪰
Scedil;	U+0015E	Ş
scedil;	U+0015F	ş
Scirc;	U+0015C	Ŝ
scirc;	U+0015D	ŝ
scnap;	U+02ABA	⪺
scnE;	U+02AB6	⪶
scnsim;	U+022E9	⋩
scpolint;	U+02A13	⨓
scsim;	U+0227F	≿
Scy;	U+00421	С
scy;	U+00441	с
sdot;	U+022C5	⋅
sdotb;	U+022A1	⊡
sdote;	U+02A66	⩦
searhk;	U+02925	⤥
seArr;	U+021D8	⇘
searr;	U+02198	↘
searrow;	U+02198	↘
sect;	U+000A7	§
sect	U+000A7	§
semi;	U+0003B	;
seswar;	U+02929	⤩
setminus;	U+02216	∖
setmn;	U+02216	∖
sext;	U+02736	✶
Sfr;	U+1D516	𝔖
sfr;	U+1D530	𝔰
sfrown;	U+02322	⌢
sharp;	U+0266F	♯
SHCHcy;	U+00429	Щ
shchcy;	U+00449	щ
SHcy;	U+00428	Ш
shcy;	U+00448	ш
ShortDownArrow;	U+02193	↓
ShortLeftArrow;	U+02190	←
shortmid;	U+02223	∣
shortparallel;	U+02225	∥
ShortRightArrow;	U+02192	→
ShortUpArrow;	U+02191	↑
shy;	U+000AD	
shy	U+000AD	
Sigma;	U+003A3	Σ
sigma;	U+003C3	σ
sigmaf;	U+003C2	ς
sigmav;	U+003C2	ς
sim;	U+0223C	∼
simdot;	U+02A6A	⩪
sime;	U+02243	≃
simeq;	U+02243	≃
simg;	U+02A9E	⪞
simgE;	U+02AA0	⪠
siml;	U+02A9D	⪝
simlE;	U+02A9F	⪟
simne;	U+02246	≆
simplus;	U+02A24	⨤
simrarr;	U+02972	⥲
slarr;	U+02190	←

SmallCircle;	U+02218	∘
smallsetminus;	U+02216	∖
smashp;	U+02A33	⨳
smeparsl;	U+029E4	⧤
smid;	U+02223	∣
smile;	U+02323	⌣
smt;	U+02AAA	⪪
smte;	U+02AAC	⪬
smtes;	U+02AAC U+0FE00	⪬
SOFTcy;	U+0042C	Ь
softcy;	U+0044C	ь
sol;	U+0002F	/
solb;	U+029C4	⧄
solbar;	U+0233F	⌿
Sopf;	U+1D54A	𝕊
sopf;	U+1D564	𝕤
spades;	U+02660	♠
spadesuit;	U+02660	♠
spar;	U+02225	∥
sqcap;	U+02293	⊓
sqcaps;	U+02293 U+0FE00	⊓
sqcup;	U+02294	⊔
sqcups;	U+02294 U+0FE00	⊔
Sqrt;	U+0221A	√
sqsub;	U+0228F	⊏
sqsube;	U+02291	⊑
sqsubset;	U+0228F	⊏
sqsubseteq;	U+02291	⊑
sqsup;	U+02290	⊐
sqsupe;	U+02292	⊒
sqsupset;	U+02290	⊐
sqsupseteq;	U+02292	⊒
squ;	U+025A1	□
Square;	U+025A1	□
square;	U+025A1	□
SquareIntersection;	U+02293	⊓
SquareSubset;	U+0228F	⊏
SquareSubsetEqual;	U+02291	⊑
SquareSuperset;	U+02290	⊐
SquareSupersetEqual;	U+02292	⊒
SquareUnion;	U+02294	⊔
squarf;	U+025AA	▪
squf;	U+025AA	▪
srarr;	U+02192	→
Sscr;	U+1D4AE	𝒮
sscr;	U+1D4C8	𝓈
ssetmn;	U+02216	∖
ssmile;	U+02323	⌣
sstarf;	U+022C6	⋆
Star;	U+022C6	⋆
star;	U+02606	☆
starf;	U+02605	★
straightepsilon;	U+003F5	ϵ
straightphi;	U+003D5	ϕ
strns;	U+000AF	¯
Sub;	U+022D0	⋐
sub;	U+02282	⊂
subdot;	U+02ABD	⪽
subE;	U+02AC5	⫅
sube;	U+02286	⊆
subedot;	U+02AC3	⫃
submult;	U+02AC1	⫁

subnE;	U+02ACB	⫋
subne;	U+0228A	⊊
subplus;	U+02ABF	⪿
subrarr;	U+02979	⥹
Subset;	U+022D0	⋐
subset;	U+02282	⊂
subseteq;	U+02286	⊆
subseteqq;	U+02AC5	⫅
SubsetEqual;	U+02286	⊆
subsetneq;	U+0228A	⊊
subsetneqq;	U+02ACB	⫋
subsim;	U+02AC7	⫇
subsub;	U+02AD5	⫕
subsup;	U+02AD3	⫓
succ;	U+0227B	≻
succapprox;	U+02AB8	⪸
succcurlyeq;	U+0227D	≽
Succeeds;	U+0227B	≻
SucceedsEqual;	U+02AB0	⪰
SucceedsSlantEqual;	U+0227D	≽
SucceedsTilde;	U+0227F	≿
succeq;	U+02AB0	⪰
succnapprox;	U+02ABA	⪺
succneqq;	U+02AB6	⪶
succnsim;	U+022E9	⋩
succsim;	U+0227F	≿
SuchThat;	U+0220B	∋
Sum;	U+02211	∑
sum;	U+02211	∑
sung;	U+0266A	♪
Sup;	U+022D1	⋑
sup;	U+02283	⊃
sup1;	U+000B9	¹
sup1	U+000B9	¹
sup2;	U+000B2	²
sup2	U+000B2	²
sup3;	U+000B3	³
sup3	U+000B3	³
supdot;	U+02ABE	⪾
supdsub;	U+02AD8	⫘
supE;	U+02AC6	⫆
supe;	U+02287	⊇
supedot;	U+02AC4	⫄
Superset;	U+02283	⊃
SupersetEqual;	U+02287	⊇
suphsol;	U+027C9	⟉
suphsub;	U+02AD7	⫗
suplarr;	U+0297B	⥻
supmult;	U+02AC2	⫂
supnE;	U+02ACC	⫌
supne;	U+0228B	⊋
supplus;	U+02AC0	⫀
Supset;	U+022D1	⋑
supset;	U+02283	⊃
supseteq;	U+02287	⊇
supseteqq;	U+02AC6	⫆
supsetneq;	U+0228B	⊋
supsetneqq;	U+02ACC	⫌
supsim;	U+02AC8	⫈
supsub;	U+02AD4	⫔
supsup;	U+02AD6	⫖

swarhk;	U+02926	⤦
swArr;	U+021D9	⇙
swarr;	U+02199	↙
swarrow;	U+02199	↙
swnwar;	U+0292A	⤪
szlig;	U+000DF	ß
szlig	U+000DF	ß
Tab;	U+00009	
target;	U+02316	⌖
Tau;	U+003A4	Τ
tau;	U+003C4	τ
tbrk;	U+023B4	⎴
Tcaron;	U+00164	Ť
tcaron;	U+00165	ť
Tcedil;	U+00162	Ţ
tcedil;	U+00163	ţ
Tcy;	U+00422	Т
tcy;	U+00442	т
tdot;	U+020DB	◌⃛
telrec;	U+02315	⌕
Tfr;	U+1D517	𝔗
tfr;	U+1D531	𝔱
there4;	U+02234	∴
Therefore;	U+02234	∴
therefore;	U+02234	∴
Theta;	U+00398	Θ
theta;	U+003B8	θ
thetasym;	U+003D1	ϑ
thetav;	U+003D1	ϑ
thickapprox;	U+02248	≈
thicksim;	U+0223C	∼
ThickSpace;	U+0205F U+0200A	␣
thinsp;	U+02009	␣
ThinSpace;	U+02009	␣
thkap;	U+02248	≈
thksim;	U+0223C	∼
THORN;	U+000DE	Þ
THORN	U+000DE	Þ
thorn;	U+000FE	þ
thorn	U+000FE	þ
Tilde;	U+0223C	∼
tilde;	U+002DC	˜
TildeEqual;	U+02243	≃
TildeFullEqual;	U+02245	≅
TildeTilde;	U+02248	≈
times;	U+000D7	×
times	U+000D7	×
timesb;	U+022A0	⊠
timesbar;	U+02A31	⨱
timesd;	U+02A30	⨰
tint;	U+0222D	∭
toea;	U+02928	⤨
top;	U+022A4	⊤
topbot;	U+02336	⌶
topcir;	U+02AF1	⫱
Topf;	U+1D54B	𝕋
topf;	U+1D565	𝕥
topfork;	U+02ADA	⫚
tosa;	U+02929	⤩
tprime;	U+02034	‴
TRADE;	U+02122	™
trade;	U+02122	™
triangle;	U+025B5	▵
triangledown;	U+025BF	▿
triangleleft;	U+025C3	◃

trianglelefteq;	U+022B4	⊴
triangleq;	U+0225C	≜
triangleright;	U+025B9	▹
trianglerighteq;	U+022B5	⊵
tridot;	U+025EC	◬
trie;	U+0225C	≜
triminus;	U+02A3A	⨺
TripleDot;	U+020DB	◌⃛
triplus;	U+02A39	⨹
trisb;	U+029CD	⧍
tritime;	U+02A3B	⨻
trpezium;	U+023E2	⏢
Tscr;	U+1D4AF	𝒯
tscr;	U+1D4C9	𝓉
TScy;	U+00426	Ц
tscy;	U+00446	ц
TSHcy;	U+0040B	Ћ
tshcy;	U+0045B	ћ
Tstrok;	U+00166	Ŧ
tstrok;	U+00167	ŧ
twixt;	U+0226C	≬
twoheadleftarrow;	U+0219E	↞
twoheadrightarrow;	U+021A0	↠
Uacute;	U+000DA	Ú
Uacute	U+000DA	Ú
uacute;	U+000FA	ú
uacute	U+000FA	ú
Uarr;	U+0219F	↟
uArr;	U+021D1	⇑
uarr;	U+02191	↑
Uarrocir;	U+02949	⥉
Ubrcy;	U+0040E	Ў
ubrcy;	U+0045E	ў
Ubreve;	U+0016C	Ŭ
ubreve;	U+0016D	ŭ
Ucirc;	U+000DB	Û
Ucirc	U+000DB	Û
ucirc;	U+000FB	û
ucirc	U+000FB	û
Ucy;	U+00423	У
ucy;	U+00443	у
udarr;	U+021C5	⇅
Udblac;	U+00170	Ű
udblac;	U+00171	ű
udhar;	U+0296E	⥮
ufisht;	U+0297E	⥾
Ufr;	U+1D518	𝔘
ufr;	U+1D532	𝔲
Ugrave;	U+000D9	Ù
Ugrave	U+000D9	Ù
ugrave;	U+000F9	ù
ugrave	U+000F9	ù
uHar;	U+02963	⥣
uharl;	U+021BF	↿
uharr;	U+021BE	↾
uhblk;	U+02580	▀
ulcorn;	U+0231C	⌜
ulcorner;	U+0231C	⌜
ulcrop;	U+0230F	⌏
ultri;	U+025F8	◸
Umacr;	U+0016A	Ū
umacr;	U+0016B	ū
uml;	U+000A8	¨
uml	U+000A8	¨

UnderBar;	U+0005F	_
UnderBrace;	U+023DF	⏟
UnderBracket;	U+023B5	⎵
UnderParenthesis;	U+023DD	⏝
Union;	U+022C3	⋃
UnionPlus;	U+0228E	⊎
Uogon;	U+00172	Ų
uogon;	U+00173	ų
Uopf;	U+1D54C	𝕌
uopf;	U+1D566	𝕦
UpArrow;	U+02191	↑
Uparrow;	U+021D1	⇑
uparrow;	U+02191	↑
UpArrowBar;	U+02912	⤒
UpArrowDownArrow;	U+021C5	⇅
UpDownArrow;	U+02195	↕
Updownarrow;	U+021D5	⇕
updownarrow;	U+02195	↕
UpEquilibrium;	U+0296E	⥮
upharpoonleft;	U+021BF	↿
upharpoonright;	U+021BE	↾
uplus;	U+0228E	⊎
UpperLeftArrow;	U+02196	↖
UpperRightArrow;	U+02197	↗
Upsi;	U+003D2	ϒ
upsi;	U+003C5	υ
upsih;	U+003D2	ϒ
Upsilon;	U+003A5	Υ
upsilon;	U+003C5	υ
UpTee;	U+022A5	⊥
UpTeeArrow;	U+021A5	↥
upuparrows;	U+021C8	⇈
urcorn;	U+0231D	⌝
urcorner;	U+0231D	⌝
urcrop;	U+0230E	⌎
Uring;	U+0016E	Ů
uring;	U+0016F	ů
urtri;	U+025F9	◹
Uscr;	U+1D4B0	𝒰
uscr;	U+1D4CA	𝓊
utdot;	U+022F0	⋰
Utilde;	U+00168	Ũ
utilde;	U+00169	ũ
utri;	U+025B5	▵
utrif;	U+025B4	▴
uuarr;	U+021C8	⇈
Uuml;	U+000DC	Ü
Uuml	U+000DC	Ü
uuml;	U+000FC	ü
uuml	U+000FC	ü
uwangle;	U+029A7	⦧
vangrt;	U+0299C	⦜
varepsilon;	U+003F5	ϵ
varkappa;	U+003F0	ϰ
varnothing;	U+02205	∅
varphi;	U+003D5	ϕ
varpi;	U+003D6	ϖ
varpropto;	U+0221D	∝
vArr;	U+021D5	⇕
varr;	U+02195	↕
varrho;	U+003F1	ϱ
varsigma;	U+003C2	ς
varsubsetneq;	U+0228A U+0FE00	⊊
varsubsetneqq;	U+02ACB U+0FE00	⫋
	U+0228B U+0FE00	⊋

varsupsetneq;	U+0228B U+0FE00	⊋
varsupsetneqq;	U+02ACC U+0FE00	⫌
vartheta;	U+003D1	ϑ
vartriangleleft;	U+022B2	⊲
vartriangleright;	U+022B3	⊳
Vbar;	U+02AEB	⫫
vBar;	U+02AE8	⫨
vBarv;	U+02AE9	⫩
Vcy;	U+00412	В
vcy;	U+00432	в
VDash;	U+022AB	⊫
Vdash;	U+022A9	⊩
vDash;	U+022A8	⊨
vdash;	U+022A2	⊢
Vdashl;	U+02AE6	⫦
Vee;	U+022C1	⋁
vee;	U+02228	∨
veebar;	U+022BB	⊻
veeeq;	U+0225A	≚
vellip;	U+022EE	⋮
Verbar;	U+02016	‖
verbar;	U+0007C	|
Vert;	U+02016	‖
vert;	U+0007C	|
VerticalBar;	U+02223	∣
VerticalLine;	U+0007C	|
VerticalSeparator;	U+02758	❘
VerticalTilde;	U+02240	≀
VeryThinSpace;	U+0200A	
Vfr;	U+1D519	𝔙
vfr;	U+1D533	𝔳
vltri;	U+022B2	⊲
vnsub;	U+02282 U+020D2	⊂⃒
vnsup;	U+02283 U+020D2	⊃⃒
Vopf;	U+1D54D	𝕍
vopf;	U+1D567	𝕧
vprop;	U+0221D	∝
vrtri;	U+022B3	⊳
Vscr;	U+1D4B1	𝒱
vscr;	U+1D4CB	𝓋
vsubnE;	U+02ACB U+0FE00	⫋
vsubne;	U+0228A U+0FE00	⊊
vsupnE;	U+02ACC U+0FE00	⫌
vsupne;	U+0228B U+0FE00	⊋
Vvdash;	U+022AA	⊪
vzigzag;	U+0299A	⦚
Wcirc;	U+00174	Ŵ
wcirc;	U+00175	ŵ
wedbar;	U+02A5F	⩟
Wedge;	U+022C0	⋀
wedge;	U+02227	∧
wedgeq;	U+02259	≙
weierp;	U+02118	℘
Wfr;	U+1D51A	𝔚
wfr;	U+1D534	𝔴
Wopf;	U+1D54E	𝕎
wopf;	U+1D568	𝕨
wp;	U+02118	℘
wr;	U+02240	≀
wreath;	U+02240	≀
Wscr;	U+1D4B2	𝒲
wscr;	U+1D4CC	𝓌
xcap;	U+022C2	⋂

xcirc;	U+025EF	◯
xcup;	U+022C3	⋃
xdtri;	U+025BD	▽
Xfr;	U+1D51B	𝔛
xfr;	U+1D535	𝔵
xhArr;	U+027FA	⟺
xharr;	U+027F7	⟷
Xi;	U+0039E	Ξ
xi;	U+003BE	ξ
xlArr;	U+027F8	⟸
xlarr;	U+027F5	⟵
xmap;	U+027FC	⟼
xnis;	U+022FB	⋻
xodot;	U+02A00	⨀
Xopf;	U+1D54F	𝕏
xopf;	U+1D569	𝕩
xoplus;	U+02A01	⨁
xotime;	U+02A02	⨂
xrArr;	U+027F9	⟹
xrarr;	U+027F6	⟶
Xscr;	U+1D4B3	𝒳
xscr;	U+1D4CD	𝓍
xsqcup;	U+02A06	⨆
xuplus;	U+02A04	⨄
xutri;	U+025B3	△
xvee;	U+022C1	⋁
xwedge;	U+022C0	⋀
Yacute;	U+000DD	Ý
Yacute	U+000DD	Ý
yacute;	U+000FD	ý
yacute	U+000FD	ý
YAcy;	U+0042F	Я
yacy;	U+0044F	я
Ycirc;	U+00176	Ŷ
ycirc;	U+00177	ŷ
Ycy;	U+0042B	Ы
ycy;	U+0044B	ы
yen;	U+000A5	¥
yen	U+000A5	¥
Yfr;	U+1D51C	𝔜
yfr;	U+1D536	𝔶
YIcy;	U+00407	Ї
yicy;	U+00457	ї
Yopf;	U+1D550	𝕐
yopf;	U+1D56A	𝕪
Yscr;	U+1D4B4	𝒴
yscr;	U+1D4CE	𝓎
YUcy;	U+0042E	Ю
yucy;	U+0044E	ю
Yuml;	U+00178	Ÿ
yuml;	U+000FF	ÿ
yuml	U+000FF	ÿ
Zacute;	U+00179	Ź
zacute;	U+0017A	ź
Zcaron;	U+0017D	Ž
zcaron;	U+0017E	ž
Zcy;	U+00417	З
zcy;	U+00437	з
Zdot;	U+0017B	Ż
zdot;	U+0017C	ż
zeetrf;	U+02128	ℨ
ZeroWidthSpace;	U+0200B	
Zeta;	U+00396	Ζ
zeta;	U+003B6	ζ
Zfr;	U+02128	ℨ
zfr;	U+1D537	𝔷

zfr;	U+1D537	𝔷
ZHcy;	U+00416	Ж
zhcy;	U+00436	ж
zigrarr;	U+021DD	⇝
Zopf;	U+02124	ℤ
zopf;	U+1D56B	𝕫
Zscr;	U+1D4B5	𝒵
zscr;	U+1D4CF	𝓏
zwj;	U+0200D	
zwnj;	U+0200C	

This data is also available as a JSON file.

The glyphs displayed above are non-normative. Refer to the Unicode specifications for formal definitions of the characters listed above.