

Instituto Tecnológico de Costa Rica
Escuela de Ingeniería en Computación

Documentación: Scanner XHTML

Curso: Compiladores e Intérpretes
Erick Castillo Quesada
201138074
Leonardo Mendoza Fernández
201101376

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• Descripción del problema

El problema general para el presente proyecto, consiste en generar un analizador sintáctico para archivos de tipo XHTML, que cree un parse tree, utilizando la herramienta de programación BISON. Como su nombre lo indica, este deberá revisar la secuencia en el documento que recibe como argumento a la hora de ser llamado el programa, llamado parser. Así, mediante un parser generado por Bison, de tipo bottom up, se generara un parse tree del documento especificado, o retornará error en caso de poseerlo. Para esto se deberá adaptar el scanner generado en la primera tarea para que interactue con el parser.

Para poder solucionar el problema primero se debe definir el problema general, en acciones o problemas específicos. El cual se puede descomponer, básicamente, en los siguientes puntos:

- *Seleccionar la herramienta (Bison,YACC)
- *Definir la gramática
- *Adaptar el scanner
- *Comprender la estructura XHTML
- *Definir los errores sintácticos
- *Generar el parse tree
- *Imprimir el parse tree
- *Crear algoritmos para solucionar el problema

Una vez definidos estos puntos, se les puede dar solución.

En cuanto a la herramienta utilizada, se utilizó Bison. Debido a diversas razones, las cuales serán mencionadas posteriormente en el documento, se seleccionó esta herramienta y no su relativa YACC.

Para poder crear un analizador sintáctico para este tipo de archivos, primero se debe realizar una comprensión a profundidad sobre la estructura del XHTML, las etiquetas que deben ir anidadas dentro de otros y la estructura básica. Todo esto conlleva a resolver los siguientes problemas.

Una vez comprendida la estructura del XHTML, se puede definir la gramática y los errores léxicos. Ambos puntos serán discutidos posteriormente en el documento.

Por último, el problema se puede resumir en unificar todos los elementos y problemas mencionados anteriormente para generar el parse tree, mediante la creación de algoritmos que permitan resolver el problema de manera adecuada.

• **Diseño del programa:**

Para poder resolver el problema de definieron los siguientes puntos necesarios u algoritmos que en conjunto permiten generar un scanner para archivos XHTML

Primero se seleccionó la herramienta Bison, las razones se explicarán después.

Luego, se prosiguió a adaptar el scanner generado en la primera tarea para que sólo leyera la lista indicada por el profesor, las cual es la siguiente:

Comentarios	DI	Html	Script
Doctype	Dt	Img	Span
A	Dd	Input	Strong
B	Em	Li	Style
Blockquote	Embed	Link	Table
Body	Footer	Meta	Td
Br	Form	Object	Th
Button	h1-h6	Ol	Tr
Caption	Head	Option	Textarea
Code	Header	P	Title
Div	Hr	Pre	ul

Sin embargo, de esas no se utilizaron header y footer ya que estas son sólo parte de HTML 5 y no de XHTML. Además, embed no se utiliza ya que es considerada no útil o “deprecated” para XHTML.

Luego, se investigó sobre la estructura que debe llevar un documento válido de XHTML, con las etiquetas que deben contener a las otras.

Para poder crear el analizador, se definió la siguiente gramática y los TOKENS que utilizan el scanner y el parser para comunicarse. Sobre las acciones asociadas a cada producción se hablará más adelante:

```
%token      <str>      T_COMMENT      T_COMMENT_CLOSE      T_TAG_OPEN
T_TAG_CLOSE_CLOSE  T_TAG_CLOSE_OPEN  T_TAG_CLOSE  T_DOCTYPE  T_TAG_A
T_TAG_B      T_TAG_BLOCKQUOTE      T_TAG_BODY      T_TAG_BR      T_TAG_BUTTON
T_TAG_CAPTION  T_TAG_CODE      T_TAG_DIV      T_TAG_DL      T_TAG_DT      T_TAG_DD
T_TAG_EM  T_TAG_FORM      T_TAG_H1      T_TAG_H2      T_TAG_H3      T_TAG_H4      T_TAG_H5
T_TAG_H6      T_TAG_HEAD      T_TAG_HR      T_TAG_HTML      T_TAG_IMG      T_TAG_INPUT
```

```
T_TAG_LI      T_TAG_LINK    T_TAG_META    T_TAG_OBJECT  T_TAG_OL  T_TAG_P
T_TAG_PRE     T_TAG_SCRIPT    T_TAG_SPAN    T_TAG_STRONG   T_TAG_STYLE
T_TAG_TABLE   T_TAG_TD    T_TAG_TH    T_TAG_TR    T_TAG_TEXTAREA  T_TAG_TITLE
T_TAG_UL      T_ATTR      T_EQUAL      T_COMILLA    T_STRING    T_VALUE  T_ERROR
T_ERROR_EOF  T_IGNORE  T_EOF
```

Definicion de la gramatica: Se define la gramatica de la forma

NO-TERMINAL->

TERMINAL|NO-TERMINAL|TERMINAL

NO-TERMINAL|NO-TERMINAL TERMINAL| *vacio*

Un no terminal consiste en un token

Para la forma NO-TERMINAL pueden ser varios no terminales

Para la forma $TERMINAL\ NO-TERMINAL|NO-TERMINAL\ TERMINAL$ puede haber x no terminales y m terminales

La produccion inicial es `xhtml_doc` la cual se desglosa en `DOCTYPE` y `HTML` de las cuales se desprende el resto de la gramatica

A partir de aquí considere etiqueta en las producciones como el nombre de cualquier etiqueta(ej: `html`,`blockquote`,`br`,...)

Las producciones son de la forma

etiqueta: abre_etiqueta content_etiqueta cierra_etiqueta

para etiquetas que deben poseer obligatoriamente un tag de cierre de la forma `</etiqueta>`

```

    abre_etiqueta tiene la forma abre_etiqueta: T_TAG_OPEN T_TAG_ETIQUETA
    atributos T TAG CLOSE

```

```

cierra_etiqueta tiene la forma cierra_etiqueta: T_TAG_CLOSE_OPEN
T_TAG ETIQUETA T_TAG CLOSE

```

content_etiqueta es el arbol de todo el contenido de la etiqueta, cada etiqueta tiene su produccion

especifica, donde se declara cuales etiquetas o valores puede tener y cuales debe para los casos

de las etiquetas que no pueden ser cerradas hasta que contengan alguna otra en su interior.

Hay producciones de la forma

etiqueta: T_TAG_OPEN T_TAG_ETIQUETA T_TAG_CLOSE CLOSE

para producciones sin contenido de la forma <etiqueta/>

Para los atributos se tiene la produccion atributos para determinar si es uno, varios o ningun atributo

Cada atributo consiste en la produccion atributo: T_ATR T_IGUAL T_COMILLA value T_COMILLA donde value es un

arbol con el valor del atributo. La produccion de value permite uno o mas valores.

Ademas hay otras producciones auxiliares para resolver conflictos de shift/reduce y reduce/reduce

```
xhtml_doc : DOCTYPE HTML      {$$      =      creaNodoRedEGG("xhtml_doc",
$1,$2);imprimeNodos($$,0);};
DOCTYPE: T_DOCTYPE      {$$ = creaNodoRedET("DOCTYPE","T_DOCTYPE",$1);};
```

```
HTML : abre_html content_html cierra_html {$$ = creaNodoRedEGGG("HTML",$1,$2,$3);};
abre_html:      T_TAG_OPEN      T_TAG_HTML      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_html","T_TAG_HTML",$2,$3,"T_TAG_CLOSE",$4);};
cierra_html:      T_TAG_CLOSE_OPEN      T_TAG_HTML      T_TAG_CLOSE      {$$      =
creaNodoRedCierra("cierra_html","T_TAG_HTML",$2);};
content_html: head body {$$ = creaNodoRedEGG("content_html",$1,$2);};
```

```
head: abre_head content_head cierra_head {$$ = creaNodoRedEGGG("head",$1,$2,$3);};
abre_head:      T_TAG_OPEN      T_TAG_HEAD      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_head","T_TAG_HEAD",$2,$3,"T_TAG_CLOSE",$4);};
cierra_head:      T_TAG_CLOSE_OPEN      T_TAG_HEAD      T_TAG_CLOSE      {$$      =
creaNodoRedCierra("cierra_head","T_TAG_HEAD",$2);};
```

```
content_head:
    title          {$$ = creaNodoRedEG("content_head",$1);}
    | title content_head2          {$$ = creaNodoRedEGG("content_head",$1,$2);}
    | content_head2 title          {$$ = creaNodoRedEGG("content_head",$1,$2);}
    | content_head2 title content_head2 {$$      =      creaNodoRedEGGG("content_head",
$1,$2,$3);}
;
```

```
content_head2:
    content_head2 content_head3      {$$ = creaNodoRedEGG("content_head2",$1,$2);}
    | content_head3          {$$ = creaNodoRedEG("content_head2",$1);}
;
```

```
content_head3:
    link          {$$ = creaNodoRedEG("content_head3",$1);}
    | meta          {$$ = creaNodoRedEG("content_head3",$1);}
    | script {$$ = creaNodoRedEG("content_head3",$1);}
    | style          {$$ = creaNodoRedEG("content_head3",$1);}
;
```

```
body: abre_body content_body cierra_body {$$ = creaNodoRedEGGG("body",$1,$2,$3);};
abre_body:      T_TAG_OPEN      T_TAG_BODY      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_body","T_TAG_BODY",$2,$3,"T_TAG_CLOSE",$4);};
cierra_body:      T_TAG_CLOSE_OPEN      T_TAG_BODY      T_TAG_CLOSE      {$$      =
creaNodoRedCierra("cierra_body","T_TAG_BODY",$2);};
```

```
content_body:
    content_body tag_a          {$$ = creaNodoRedEGG("content_body",$1,$2);}
    | content_body tag_b          {$$ = creaNodoRedEGG("content_body",$1,$2);}
    | content_body blockquote      {$$ = creaNodoRedEGG("content_body",$1,$2);}
```

```

| content_body br          {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body button      {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body code        {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body div         {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body dl          {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body em          {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body form        {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body h1          {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body h2          {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body h3          {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body h4          {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body h5          {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body h6          {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body hr          {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body img         {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body input       {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body object      {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body ol          {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body tag_p       {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body pre         {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body script      {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body span        {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body strong      {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body table       {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body textarea    {$$ = creaNodoRedEGG("content_body",$1,$2);}
| content_body ul          {$$ = creaNodoRedEGG("content_body",$1,$2);}
|      {$$ = creaNodoRedVacía("content_body");}
;

```

```

tag_a: abre_a content_a cierra_a {$$ = creaNodoRedEGGG("tag_a",$1,$2,$3);}
abre_a:      T_TAG_OPEN      T_TAG_A      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_a","T_TAG_A",$2,$3,"T_TAG_CLOSE",$4);}
cierra_a:      T_TAG_CLOSE_OPEN      T_TAG_A      T_TAG_CLOSE      {$$      =
creaNodoRedCierra("cierra_a","T_TAG_A",$2);}
content_a:
    content_a T_STRING {$$ = creaNodoRedEET("content_a",$1,"T_STRING",$2);}
| content_a tag_b      {$$ = creaNodoRedEGG("content_a",$1,$2);}
| content_a br         {$$ = creaNodoRedEGG("content_a",$1,$2);}
| content_a button     {$$ = creaNodoRedEGG("content_a",$1,$2);}
| content_a code       {$$ = creaNodoRedEGG("content_a",$1,$2);}
| content_a em         {$$ = creaNodoRedEGG("content_a",$1,$2);}
| content_a img        {$$ = creaNodoRedEGG("content_a",$1,$2);}
| content_a input      {$$ = creaNodoRedEGG("content_a",$1,$2);}
| content_a object     {$$ = creaNodoRedEGG("content_a",$1,$2);}
| content_a script     {$$ = creaNodoRedEGG("content_a",$1,$2);}
| content_a span       {$$ = creaNodoRedEGG("content_a",$1,$2);}

```



```

| content_a strong    {$$ = creaNodoRedEGG("content_a",$1,$2);}
| content_a textarea  {$$ = creaNodoRedEGG("content_a",$1,$2);}
|                    {$$ = creaNodoRedVacía("content_a");}
;

```

```

tag_b: abre_b content_b cierra_b {$$ = creaNodoRedEGGG("tag_b",$1,$2,$3);}
abre_b:      T_TAG_OPEN      T_TAG_B      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_b","T_TAG_B",$2,$3,"T_TAG_CLOSE",$4);}
cierra_b:    T_TAG_CLOSE_OPEN    T_TAG_B    T_TAG_CLOSE    {$$      =
creaNodoRedCierra("cierra_b","T_TAG_B",$2);}
content_b:
    content_b T_STRING {$$ = creaNodoRedEET("content_b",$1,"T_STRING",$2);}
    | content_b tag_a    {$$ = creaNodoRedEGG("content_b",$1,$2);}
    | content_b tag_b    {$$ = creaNodoRedEGG("content_b",$1,$2);}
    | content_b br       {$$ = creaNodoRedEGG("content_b",$1,$2);}
    | content_b button   {$$ = creaNodoRedEGG("content_b",$1,$2);}
    | content_b code     {$$ = creaNodoRedEGG("content_b",$1,$2);}
    | content_b em       {$$ = creaNodoRedEGG("content_b",$1,$2);}
    | content_b img      {$$ = creaNodoRedEGG("content_b",$1,$2);}
    | content_b input    {$$ = creaNodoRedEGG("content_b",$1,$2);}
    | content_b object   {$$ = creaNodoRedEGG("content_b",$1,$2);}
    | content_b script   {$$ = creaNodoRedEGG("content_b",$1,$2);}
    | content_b span     {$$ = creaNodoRedEGG("content_b",$1,$2);}
    | content_b strong   {$$ = creaNodoRedEGG("content_b",$1,$2);}
    | content_b textarea {$$ = creaNodoRedEGG("content_b",$1,$2);}
    |                    {$$ = creaNodoRedVacía("content_b");}
;

```

```

blockquote:  abre_blockquote  content_blockquote  cierra_blockquote  {$$      =
creaNodoRedEGGG("blockquote",$1,$2,$3);}
abre_blockquote: T_TAG_OPEN T_TAG_BLOCKQUOTE atributos T_TAG_CLOSE {$$ =
creaNodoRedAbre("abre_blockquote","T_TAG_BLOCKQUOTE",$2,$3,"T_TAG_CLOSE",$4);}
cierra_blockquote: T_TAG_CLOSE_OPEN T_TAG_BLOCKQUOTE T_TAG_CLOSE {$$ =
creaNodoRedCierra("cierra_blockquote","T_TAG_BLOCKQUOTE",$2);}
content_blockquote:
    content_blockquote T_STRING    {$$      =  creaNodoRedEET("content_blockquote",
$1,"T_STRING",$2);}
    | content_blockquote tag_a    {$$ = creaNodoRedEGG("content_blockquote",$1,$2);}
    | content_blockquote tag_b    {$$ = creaNodoRedEGG("content_blockquote",$1,$2);}
    | content_blockquote blockquote    {$$      =  creaNodoRedEGG("content_blockquote",
$1,$2);}
    | content_blockquote br       {$$      =  creaNodoRedEGG("content_blockquote",
$1,$2);}
    | content_blockquote button   {$$ = creaNodoRedEGG("content_blockquote",$1,$2);}
    | content_blockquote code     {$$ = creaNodoRedEGG("content_blockquote",$1,$2);}
    | content_blockquote div      {$$ = creaNodoRedEGG("content_blockquote",$1,$2);}

```

```

        | content_blockquote dl          {$$ = creaNodoRedEGG("content_blockquote",
$1,$2);}
        | content_blockquote em          {$$ = creaNodoRedEGG("content_blockquote",
$1,$2);}
        | content_blockquote form      {$$ = creaNodoRedEGG("content_blockquote",$1,$2);}
        | content_blockquote h1          {$$ = creaNodoRedEGG("content_blockquote",
$1,$2);}
        | content_blockquote h2          {$$ = creaNodoRedEGG("content_blockquote",
$1,$2);}
        | content_blockquote h3          {$$ = creaNodoRedEGG("content_blockquote",
$1,$2);}
        | content_blockquote h4          {$$ = creaNodoRedEGG("content_blockquote",
$1,$2);}
        | content_blockquote h5          {$$ = creaNodoRedEGG("content_blockquote",
$1,$2);}
        | content_blockquote h6          {$$ = creaNodoRedEGG("content_blockquote",
$1,$2);}
        | content_blockquote hr          {$$ = creaNodoRedEGG("content_blockquote",
$1,$2);}
        | content_blockquote img        {$$ = creaNodoRedEGG("content_blockquote",$1,$2);}
        | content_blockquote input      {$$ = creaNodoRedEGG("content_blockquote",$1,$2);}
        | content_blockquote object     {$$ = creaNodoRedEGG("content_blockquote",$1,$2);}
        | content_blockquote ol          {$$ = creaNodoRedEGG("content_blockquote",
$1,$2);}
        | content_blockquote tag_p      {$$ = creaNodoRedEGG("content_blockquote",$1,$2);}
        | content_blockquote pre        {$$ = creaNodoRedEGG("content_blockquote",$1,$2);}
        | content_blockquote script     {$$ = creaNodoRedEGG("content_blockquote",$1,$2);}
        | content_blockquote span       {$$ = creaNodoRedEGG("content_blockquote",$1,$2);}
        | content_blockquote strong     {$$ = creaNodoRedEGG("content_blockquote",$1,$2);}
        | content_blockquote table      {$$ = creaNodoRedEGG("content_blockquote",$1,$2);}
        | content_blockquote textarea   {$$ = creaNodoRedEGG("content_blockquote",
$1,$2);}
        | content_blockquote ul          {$$ = creaNodoRedEGG("content_blockquote",
$1,$2);}
        |                               {$$ = creaNodoRedVacia("content_blockquote");}
        ;

```

```

br:      T_TAG_OPEN      T_TAG_BR      atributos      T_TAG_CLOSE_CLOSE      {$$      =
creaNodoRedAbre("br","T_TAG_BR",$2,$3,"T_TAG_CLOSE_CLOSE",$4);}

```

```

button: abre_button      content_button      cierra_button      {$$      =      creaNodoRedEGGG("button",
$1,$2,$3);}

```

```

abre_button:      T_TAG_OPEN      T_TAG_BUTTON      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_button","T_TAG_BUTTON",$2,$3,"T_TAG_CLOSE",$4);}

```

```

cierra_button:    T_TAG_CLOSE_OPEN    T_TAG_BUTTON    T_TAG_CLOSE    {$$    =
creaNodoRedCierra("cierra_button","T_TAG_BUTTON",$2);};

```

```

content_button:

```

```

    content_button T_STRING    {$$    =    creaNodoRedEET("content_button",
$1,"T_STRING",$2);}

```

```

    | content_button tag_a    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button tag_b    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button blockquote {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button code    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button div    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button dl    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button em    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button form    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button h1    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button h2    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button h3    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button h4    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button h5    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button h6    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button hr    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button img    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button input    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button object    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button ol    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button tag_p    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button pre    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button script    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button span    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button strong    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button table    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button textarea    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    | content_button ul    {$$ = creaNodoRedEGG("content_button",$1,$2);}

```

```

    |    {$$ = creaNodoRedVacía("content_button");}

```

```

;

```

```

caption: abre_caption content_caption cierra_caption {$$ = creaNodoRedEGGG("caption",
$1,$2,$3);};

```

```

abre_caption:    T_TAG_OPEN    T_TAG_CAPTION    atributos    T_TAG_CLOSE    {$$    =
creaNodoRedAbre("abre_caption","T_TAG_CAPTION",$2,$3,"T_TAG_CLOSE",$4);};

```

```

cierra_caption:    T_TAG_CLOSE_OPEN    T_TAG_CAPTION    T_TAG_CLOSE    {$$    =
creaNodoRedCierra("cierra_caption","T_TAG_CAPTION",$2);};

```

```

content_caption:

```

```

    content_caption T_STRING    {$$    =    creaNodoRedEET("content_caption",
$1,"T_STRING",$2);}

```

```

    | content_caption tag_a    {$$ = creaNodoRedEGG("content_caption",$1,$2);}

```

```

    | content_caption tag_b    {$$ = creaNodoRedEGG("content_caption",$1,$2);}

```

```

| content_caption br          {$$ = creaNodoRedEGG("content_caption",$1,$2);}
| content_caption button      {$$ = creaNodoRedEGG("content_caption",$1,$2);}
| content_caption code        {$$ = creaNodoRedEGG("content_caption",$1,$2);}
| content_caption em          {$$ = creaNodoRedEGG("content_caption",$1,$2);}
| content_caption img         {$$ = creaNodoRedEGG("content_caption",$1,$2);}
| content_caption input       {$$ = creaNodoRedEGG("content_caption",$1,$2);}
| content_caption object      {$$ = creaNodoRedEGG("content_caption",$1,$2);}
| content_caption script      {$$ = creaNodoRedEGG("content_caption",$1,$2);}
| content_caption span        {$$ = creaNodoRedEGG("content_caption",$1,$2);}
| content_caption strong      {$$ = creaNodoRedEGG("content_caption",$1,$2);}
| content_caption textarea    {$$ = creaNodoRedEGG("content_caption",$1,$2);}
|          {$$ = creaNodoRedVacia("content_caption");}
;

```

```

code: abre_code content_code cierra_code {$$ = creaNodoRedEGGG("code",$1,$2,$3);}
abre_code:   T_TAG_OPEN   T_TAG_CODE   atributos   T_TAG_CLOSE   {$$   =
creaNodoRedAbre("abre_code","T_TAG_CODE",$2,$3,"T_TAG_CLOSE",$4);}
cierra_code:   T_TAG_CLOSE_OPEN   T_TAG_CODE   T_TAG_CLOSE   {$$   =
creaNodoRedCierra("cierra_code","T_TAG_CODE",$2);}

```

```

content_code:
    content_code T_STRING      {$$ = creaNodoRedEET("content_code",$1,"T_STRING",
$2);}

```

```

| content_code tag_a {$$ = creaNodoRedEGG("content_code",$1,$2);}
| content_code tag_b {$$ = creaNodoRedEGG("content_code",$1,$2);}
| content_code br    {$$ = creaNodoRedEGG("content_code",$1,$2);}
| content_code button {$$ = creaNodoRedEGG("content_code",$1,$2);}
| content_code code   {$$ = creaNodoRedEGG("content_code",$1,$2);}
| content_code em     {$$ = creaNodoRedEGG("content_code",$1,$2);}
| content_code img    {$$ = creaNodoRedEGG("content_code",$1,$2);}
| content_code input  {$$ = creaNodoRedEGG("content_code",$1,$2);}
| content_code object {$$ = creaNodoRedEGG("content_code",$1,$2);}
| content_code script {$$ = creaNodoRedEGG("content_code",$1,$2);}
| content_code span   {$$ = creaNodoRedEGG("content_code",$1,$2);}
| content_code strong {$$ = creaNodoRedEGG("content_code",$1,$2);}
|          {$$ = creaNodoRedVacia("content_code");}
;

```

```

div: abre_div content_div cierra_div {$$ = creaNodoRedEGGG("div",$1,$2,$3);}
abre_div:   T_TAG_OPEN   T_TAG_DIV   atributos   T_TAG_CLOSE   {$$   =
creaNodoRedAbre("abre_div","T_TAG_DIV",$2,$3,"T_TAG_CLOSE",$4);}
cierra_div:   T_TAG_CLOSE_OPEN   T_TAG_DIV   T_TAG_CLOSE   {$$   =
creaNodoRedCierra("cierra_div","T_TAG_DIV",$2);}

```

```

content_div:
    content_div T_STRING      {$$      =      creaNodoRedEET("content_div",
$1,"T_STRING",$2);}
    | content_div tag_a      {$$ = creaNodoRedEGG("content_div",$1,$2);}

```

```

| content_div tag_b      {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div blockquote {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div br         {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div button     {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div code       {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div div        {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div dl         {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div em         {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div form       {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div h1         {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div h2         {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div h3         {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div h4         {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div h5         {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div h6         {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div hr         {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div img        {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div input      {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div object     {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div ol         {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div tag_p      {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div pre        {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div script     {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div span       {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div strong     {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div table      {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div textarea   {$$ = creaNodoRedEGG("content_div",$1,$2);}
| content_div ul         {$$ = creaNodoRedEGG("content_div",$1,$2);}
|      {$$ = creaNodoRedVacía("content_div");}
;

```

```

dl: abre_dl content_dl cierra_dl {$$ = creaNodoRedEGGG("dl",$1,$2,$3);}
abre_dl:      T_TAG_OPEN      T_TAG_DL      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_dl","T_TAG_DL",$2,$3,"T_TAG_CLOSE",$4);}
cierra_dl:    T_TAG_CLOSE_OPEN      T_TAG_DL      T_TAG_CLOSE      {$$      =
creaNodoRedCierra("cierra_dl","T_TAG_DL",$2);}
content_dl:
    dt      {$$ = creaNodoRedEG("content_dl",$1);}
    | dd    {$$ = creaNodoRedEG("content_dl",$1);}
    | content_dl dt      {$$ = creaNodoRedEGG("content_dl",$1,$2);}
    | content_dl dd      {$$ = creaNodoRedEGG("content_dl",$1,$2);}
;

```

```

dd: abre_dd content_dd cierra_dd {$$ = creaNodoRedEGGG("dd",$1,$2,$3);}
abre_dd:      T_TAG_OPEN      T_TAG_DD      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_dd","T_TAG_DD",$2,$3,"T_TAG_CLOSE",$4);}

```

```

cierra_dd:      T_TAG_CLOSE_OPEN      T_TAG_DD      T_TAG_CLOSE      {$$      =
creaNodoRedCierra("cierra_dd","T_TAG_DD",$2);};

```

```

content_dd:

```

```

      content_dd T_STRING      {$$      =      creaNodoRedEET("content_dd",
$1,"T_STRING",$2);}

```

```

      | content_dd tag_a      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd tag_b      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd blockquote      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd br      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd button      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd code      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd div      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd em      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd form      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd h1      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd h2      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd h3      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd h4      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd h5      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd h6      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd hr      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd img      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd input      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd object      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd ol      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd tag_p      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd pre      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd script      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd span      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd strong      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd table      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd textarea      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      | content_dd ul      {$$ = creaNodoRedEGG("content_dd",$1,$2);}
      |      {$$ = creaNodoRedVacía("content_dd");}
;

```

```

dt: abre_dt content_dt cierra_dt {$$ = creaNodoRedEGGG("dt",$1,$2,$3);};

```

```

abre_dt:      T_TAG_OPEN      T_TAG_DT      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_dt","T_TAG_DT",$2,$3,"T_TAG_CLOSE",$4);};

```

```

cierra_dt:      T_TAG_CLOSE_OPEN      T_TAG_DT      T_TAG_CLOSE      {$$      =
creaNodoRedCierra("cierra_dt","T_TAG_DT",$2);};

```

```

content_dt:

```

```

      content_dt T_STRING      {$$      =      creaNodoRedEET("content_dt",
$1,"T_STRING",$2);}

```

```

      | content_dt tag_a      {$$ = creaNodoRedEGG("content_dt",$1,$2);}
      | content_dt tag_b      {$$ = creaNodoRedEGG("content_dt",$1,$2);}

```

```

| content_dt blockquote      {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt br              {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt button          {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt code            {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt div             {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt em              {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt form            {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt h1              {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt h2              {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt h3              {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt h4              {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt h5              {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt h6              {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt hr              {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt img             {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt input           {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt object          {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt ol              {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt tag_p           {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt pre             {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt script          {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt span            {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt strong          {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt table           {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt textarea        {$$ = creaNodoRedEGG("content_dt",$1,$2);}
| content_dt ul              {$$ = creaNodoRedEGG("content_dt",$1,$2);}
|      {$$ = creaNodoRedVacía("content_dt");}
;

```

```

em :abre_em content_em cierra_em {$$ = creaNodoRedEGGG("em",$1,$2,$3);}
abre_em:      T_TAG_OPEN      T_TAG_EM      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_em","T_TAG_EM",$2,$3,"T_TAG_CLOSE",$4);}
cierra_em:      T_TAG_CLOSE_OPEN      T_TAG_EM      T_TAG_CLOSE      {$$      =
creaNodoRedCierra("cierra_em","T_TAG_EM",$2);}
content_em:
      content_em T_STRING      {$$ = creaNodoRedEET("content_em",$1,"T_STRING",
$2);}
| content_em tag_a      {$$ = creaNodoRedEGG("content_em",$1,$2);}
| content_em tag_b      {$$ = creaNodoRedEGG("content_em",$1,$2);}
| content_em br          {$$ = creaNodoRedEGG("content_em",$1,$2);}
| content_em button      {$$ = creaNodoRedEGG("content_em",$1,$2);}
| content_em code        {$$ = creaNodoRedEGG("content_em",$1,$2);}
| content_em em          {$$ = creaNodoRedEGG("content_em",$1,$2);}
| content_em img         {$$ = creaNodoRedEGG("content_em",$1,$2);}
| content_em input       {$$ = creaNodoRedEGG("content_em",$1,$2);}
| content_em object      {$$ = creaNodoRedEGG("content_em",$1,$2);}

```

```

| content_em script    {$$ = creaNodoRedEGG("content_em",$1,$2);}
| content_em span      {$$ = creaNodoRedEGG("content_em",$1,$2);}
| content_em strong    {$$ = creaNodoRedEGG("content_em",$1,$2);}
| content_em textarea {$$ = creaNodoRedEGG("content_em",$1,$2);}
|                      {$$ = creaNodoRedVacia("content_em");}
;

```

```

form: abre_form content_form cierra_form {$$ = creaNodoRedEGGG("form",$1,$2,$3);}
abre_form:  T_TAG_OPEN  T_TAG_FORM  atributos  T_TAG_CLOSE  {$$ =
creaNodoRedAbre("abre_form","T_TAG_FORM",$2,$3,"T_TAG_CLOSE",$4);}
cierra_form:  T_TAG_CLOSE_OPEN  T_TAG_FORM  T_TAG_CLOSE  {$$ =
creaNodoRedCierra("cierra_form","T_TAG_FORM",$2);}
content_form:

```

```

    content_form tag_a      {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form tag_b    {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form blockquote {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form br       {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form button   {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form code     {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form div      {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form dl       {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form em       {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form form     {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form h1       {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form h2       {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form h3       {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form h4       {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form h5       {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form h6       {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form hr       {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form img      {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form input    {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form object   {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form ol       {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form tag_p    {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form pre      {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form script   {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form span     {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form strong   {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form table    {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form textarea {$$ = creaNodoRedEGG("content_form",$1,$2);}
    | content_form ul       {$$ = creaNodoRedEGG("content_form",$1,$2);}
    |                      {$$ = creaNodoRedVacia("content_form");}
;

```

```

h1: abre_h1 content_h1_h6 cierra_h1 {$$ = creaNodoRedEGGG("h1",$1,$2,$3);}

```



```

abre_h1:      T_TAG_OPEN      T_TAG_H1      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_h1","T_TAG_H1",$2,$3,"T_TAG_CLOSE",$4);};
cierra_h1:    T_TAG_CLOSE_OPEN      T_TAG_H1      T_TAG_CLOSE      {$$      =
creaNodoRedCierra("cierra_h1","T_TAG_H1",$2);};

```

```

h2:abre_h2 content_h1_h6 cierra_h2 {$$ = creaNodoRedEGGG("h2",$1,$2,$3);};
abre_h2:      T_TAG_OPEN      T_TAG_H2      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_h2","T_TAG_H2",$2,$3,"T_TAG_CLOSE",$4);};
cierra_h2:    T_TAG_CLOSE_OPEN      T_TAG_H2      T_TAG_CLOSE      {$$      =
creaNodoRedCierra("cierra_h2","T_TAG_H2",$2);};

```

```

h3:abre_h3 content_h1_h6 cierra_h3 {$$ = creaNodoRedEGGG("h3",$1,$2,$3);};
abre_h3:      T_TAG_OPEN      T_TAG_H3      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_h3","T_TAG_H3",$2,$3,"T_TAG_CLOSE",$4);};
cierra_h3:    T_TAG_CLOSE_OPEN      T_TAG_H3      T_TAG_CLOSE      {$$      =
creaNodoRedCierra("cierra_h3","T_TAG_H3",$2);};

```

```

h4:abre_h4 content_h1_h6 cierra_h4 {$$ = creaNodoRedEGGG("h4",$1,$2,$3);};
abre_h4:      T_TAG_OPEN      T_TAG_H4      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_h4","T_TAG_H4",$2,$3,"T_TAG_CLOSE",$4);};
cierra_h4:    T_TAG_CLOSE_OPEN      T_TAG_H4      T_TAG_CLOSE      {$$      =
creaNodoRedCierra("cierra_h4","T_TAG_H4",$2);};

```

```

h5:abre_h5 content_h1_h6 cierra_h5 {$$ = creaNodoRedEGGG("h5",$1,$2,$3);};
abre_h5:      T_TAG_OPEN      T_TAG_H5      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_h5","T_TAG_H5",$2,$3,"T_TAG_CLOSE",$4);};
cierra_h5:    T_TAG_CLOSE_OPEN      T_TAG_H5      T_TAG_CLOSE      {$$      =
creaNodoRedCierra("cierra_h5","T_TAG_H5",$2);};

```

```

h6:abre_h6 content_h1_h6 cierra_h6 {$$ = creaNodoRedEGGG("h6",$1,$2,$3);};
abre_h6:      T_TAG_OPEN      T_TAG_H6      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_h6","T_TAG_H6",$2,$3,"T_TAG_CLOSE",$4);};
cierra_h6:    T_TAG_CLOSE_OPEN      T_TAG_H6      T_TAG_CLOSE      {$$      =
creaNodoRedCierra("cierra_h6","T_TAG_H6",$2);};

```

```

content_h1_h6:
    content_h1_h6 T_STRING      {$$      =      creaNodoRedEET("content_h1_h6",
$1,"T_STRING",$2);}
    | content_h1_h6 tag_a      {$$ = creaNodoRedEGG("content_h1_h6",$1,$2);}
    | content_h1_h6 tag_b      {$$ = creaNodoRedEGG("content_h1_h6",$1,$2);}
    | content_h1_h6 br      {$$ = creaNodoRedEGG("content_h1_h6",$1,$2);}
    | content_h1_h6 button      {$$ = creaNodoRedEGG("content_h1_h6",$1,$2);}
    | content_h1_h6 code      {$$ = creaNodoRedEGG("content_h1_h6",$1,$2);}
    | content_h1_h6 em      {$$ = creaNodoRedEGG("content_h1_h6",$1,$2);}
    | content_h1_h6 img      {$$ = creaNodoRedEGG("content_h1_h6",$1,$2);}
    | content_h1_h6 input      {$$ = creaNodoRedEGG("content_h1_h6",$1,$2);}

```

```

| content_h1_h6 object          {$$ = creaNodoRedEGG("content_h1_h6",$1,$2);}
| content_h1_h6 script          {$$ = creaNodoRedEGG("content_h1_h6",$1,$2);}
| content_h1_h6 span            {$$ = creaNodoRedEGG("content_h1_h6",$1,$2);}
| content_h1_h6 strong          {$$ = creaNodoRedEGG("content_h1_h6",$1,$2);}
| content_h1_h6 textarea       {$$ = creaNodoRedEGG("content_h1_h6",$1,$2);}
|                               {$$ = creaNodoRedVacía("content_h1_h6");}
;

```

```

hr:   T_TAG_OPEN   T_TAG_HR   atributos   T_TAG_CLOSE_CLOSE   {$$   =
creaNodoRedAbre("hr","T_TAG_HR",$2,$3,"T_TAG_CLOSE_CLOSE",$4);};

```

```

img:   T_TAG_OPEN   T_TAG_IMG   atributos   T_TAG_CLOSE_CLOSE   {$$   =
creaNodoRedAbre("img","T_TAG_IMG",$2,$3,"T_TAG_CLOSE_CLOSE",$4);};

```

```

input:   T_TAG_OPEN   T_TAG_INPUT   atributos   T_TAG_CLOSE_CLOSE   {$$   =
creaNodoRedAbre("input","T_TAG_INPUT",$2,$3,"T_TAG_CLOSE_CLOSE",$4);};

```

```

li: abre_li content_li cierra_li {$$ = creaNodoRedEGGG("li",$1,$2,$3);};

```

```

abre_li:   T_TAG_OPEN   T_TAG_LI   atributos   T_TAG_CLOSE   {$$   =
creaNodoRedAbre("abre_li","T_TAG_LI",$2,$3,"T_TAG_CLOSE",$4);};

```

```

cierra_li:   T_TAG_CLOSE_OPEN   T_TAG_LI   T_TAG_CLOSE   {$$   =
creaNodoRedCierra("cierra_li","T_TAG_LI",$2);};

```

```

content_li:

```

```

content_li T_STRING {$$ = creaNodoRedEET("content_li",$1,"T_STRING",$2);}
| content_li tag_a   {$$ = creaNodoRedEGG("content_li",$1,$2);}
| content_li tag_b   {$$ = creaNodoRedEGG("content_li",$1,$2);}
| content_li br      {$$ = creaNodoRedEGG("content_li",$1,$2);}
| content_li button  {$$ = creaNodoRedEGG("content_li",$1,$2);}
| content_li code    {$$ = creaNodoRedEGG("content_li",$1,$2);}
| content_li em      {$$ = creaNodoRedEGG("content_li",$1,$2);}
| content_li img     {$$ = creaNodoRedEGG("content_li",$1,$2);}
| content_li input   {$$ = creaNodoRedEGG("content_li",$1,$2);}
| content_li object  {$$ = creaNodoRedEGG("content_li",$1,$2);}
| content_li tag_p   {$$ = creaNodoRedEGG("content_li",$1,$2);}
| content_li script  {$$ = creaNodoRedEGG("content_li",$1,$2);}
| content_li span    {$$ = creaNodoRedEGG("content_li",$1,$2);}
| content_li strong  {$$ = creaNodoRedEGG("content_li",$1,$2);}
| content_li textarea {$$ = creaNodoRedEGG("content_li",$1,$2);}
|                               {$$ = creaNodoRedVacía("content_li");}
;

```

```

link:   T_TAG_OPEN   T_TAG_LINK   atributos   T_TAG_CLOSE_CLOSE   {$$   =
creaNodoRedAbre("link","T_TAG_LINK",$2,$3,"T_TAG_CLOSE_CLOSE",$4);};

```

```

meta:   T_TAG_OPEN   T_TAG_META   atributos   T_TAG_CLOSE_CLOSE   {$$   =
creaNodoRedAbre("meta","T_TAG_META",$2,$3,"T_TAG_CLOSE_CLOSE",$4);};

```

```

object: abre_object content_object cierra_object {$$ = creaNodoRedEGGG("object",$1,$2,$3);};
abre_object: T_TAG_OPEN T_TAG_OBJECT atributos T_TAG_CLOSE {$$ =
creaNodoRedAbre("abre_object","T_TAG_OBJECT",$2,$3,"T_TAG_CLOSE",$4);};
cierra_object: T_TAG_CLOSE_OPEN T_TAG_OBJECT T_TAG_CLOSE {$$ =
creaNodoRedCierra("cierra_object","T_TAG_OBJECT",$2);};
content_object:
    content_object T_STRING {$$ = creaNodoRedEET("content_object",
$1,"T_STRING",$2);}
    | content_object tag_a {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object tag_b {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object dl {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object em {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object form {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object h1 {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object h2 {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object h3 {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object h4 {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object h5 {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object h6 {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object hr {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object img {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object input {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object object {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object ol {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object tag_p {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object pre {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object script {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object span {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object strong {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object table {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object textarea {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | content_object ul {$$ = creaNodoRedEGG("content_object",$1,$2);}
    | {$$ = creaNodoRedVacía("content_object");}
;

ol: abre_ol content_ol cierra_ol {$$ = creaNodoRedEGGG("ol",$1,$2,$3);};
abre_ol: T_TAG_OPEN T_TAG_OL atributos T_TAG_CLOSE {$$ =
creaNodoRedAbre("abre_ol","T_TAG_OL",$2,$3,"T_TAG_CLOSE",$4);};
cierra_ol: T_TAG_CLOSE_OPEN T_TAG_OL T_TAG_CLOSE {$$ =
creaNodoRedCierra("cierra_ol","T_TAG_OL",$2);};
content_ol:
    li {$$ = creaNodoRedEG("content_ol",$1);}
    | content_ol li {$$ = creaNodoRedEGG("content_ol",$1,$2);}
;

```

```

tag_p: abre_p content_p cierra_p {$$ = creaNodoRedEGGG("tag_p",$1,$2,$3);};
abre_p:      T_TAG_OPEN      T_TAG_P      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_p","T_TAG_P",$2,$3,"T_TAG_CLOSE",$4);};
cierra_p:      T_TAG_CLOSE_OPEN      T_TAG_P      T_TAG_CLOSE      {$$      =
creaNodoRedCierra("cierra_p","T_TAG_P",$2);};
content_p:
    content_p T_STRING {$$ = creaNodoRedEET("content_p",$1,"T_STRING",$2);}
    | content_p tag_a      {$$ = creaNodoRedEGG("content_p",$1,$2);}
    | content_p tag_b      {$$ = creaNodoRedEGG("content_p",$1,$2);}
    | content_p br         {$$ = creaNodoRedEGG("content_p",$1,$2);}
    | content_p button     {$$ = creaNodoRedEGG("content_p",$1,$2);}
    | content_p code       {$$ = creaNodoRedEGG("content_p",$1,$2);}
    | content_p em         {$$ = creaNodoRedEGG("content_p",$1,$2);}
    | content_p img        {$$ = creaNodoRedEGG("content_p",$1,$2);}
    | content_p input      {$$ = creaNodoRedEGG("content_p",$1,$2);}
    | content_p object     {$$ = creaNodoRedEGG("content_p",$1,$2);}
    | content_p script     {$$ = creaNodoRedEGG("content_p",$1,$2);}
    | content_p span       {$$ = creaNodoRedEGG("content_p",$1,$2);}
    | content_p strong     {$$ = creaNodoRedEGG("content_p",$1,$2);}
    | content_p textarea   {$$ = creaNodoRedEGG("content_p",$1,$2);}
    | {$$ = creaNodoRedVacía("content_p");}
;

```

```

pre: abre_pre content_pre cierra_pre {$$ = creaNodoRedEGGG("pre",$1,$2,$3);};
abre_pre:      T_TAG_OPEN      T_TAG_PRE      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_pre","T_TAG_PRE",$2,$3,"T_TAG_CLOSE",$4);};
cierra_pre:      T_TAG_CLOSE_OPEN      T_TAG_PRE      T_TAG_CLOSE      {$$      =
creaNodoRedCierra("cierra_pre","T_TAG_PRE",$2);};
content_pre:
    content_pre T_STRING      {$$ = creaNodoRedEET("content_pre",$1,"T_STRING",
$2);}
    | content_pre tag_a      {$$ = creaNodoRedEGG("content_pre",$1,$2);}
    | content_pre tag_b      {$$ = creaNodoRedEGG("content_pre",$1,$2);}
    | content_pre br         {$$ = creaNodoRedEGG("content_pre",$1,$2);}
    | content_pre button     {$$ = creaNodoRedEGG("content_pre",$1,$2);}
    | content_pre code       {$$ = creaNodoRedEGG("content_pre",$1,$2);}
    | content_pre em         {$$ = creaNodoRedEGG("content_pre",$1,$2);}
    | content_pre img        {$$ = creaNodoRedEGG("content_pre",$1,$2);}
    | content_pre input      {$$ = creaNodoRedEGG("content_pre",$1,$2);}
    | content_pre object     {$$ = creaNodoRedEGG("content_pre",$1,$2);}
    | content_pre script     {$$ = creaNodoRedEGG("content_pre",$1,$2);}
    | content_pre span       {$$ = creaNodoRedEGG("content_pre",$1,$2);}
    | content_pre strong     {$$ = creaNodoRedEGG("content_pre",$1,$2);}
    | content_pre textarea   {$$ = creaNodoRedEGG("content_pre",$1,$2);}
    | {$$ = creaNodoRedVacía("content_pre");}
;

```

```

script: abre_script content_script cierra_script {$$ = creaNodoRedEGGG("script",$1,$2,$3);};
abre_script: T_TAG_OPEN T_TAG_SCRIPT atributos T_TAG_CLOSE {$$ =
creaNodoRedAbre("abre_script","T_TAG_SCRIPT",$2,$3,"T_TAG_CLOSE",$4);};
cierra_script: T_TAG_CLOSE_OPEN T_TAG_SCRIPT T_TAG_CLOSE {$$ =
creaNodoRedCierra("cierra_script","T_TAG_SCRIPT",$2);};
content_script:
    T_STRING content_script {$$ = creaNodoRedETE("content_script","T_STRING",
$1,$2);}
    | T_TAG_CLOSE content_script {$$
creaNodoRedETE("content_script","T_TAG_CLOSE",$1,$2);}
    | T_TAG_OPEN content_script {$$
creaNodoRedETE("content_script","T_TAG_OPEN",$1,$2);}
    | {$$ = creaNodoRedVacía("content_script");}
;

```

```

span: abre_span content_span cierra_span {$$ = creaNodoRedEGGG("span",$1,$2,$3);};
abre_span: T_TAG_OPEN T_TAG_SPAN atributos T_TAG_CLOSE {$$ =
creaNodoRedAbre("abre_span","T_TAG_SPAN",$2,$3,"T_TAG_CLOSE",$4);};
cierra_span: T_TAG_CLOSE_OPEN T_TAG_SPAN T_TAG_CLOSE {$$ =
creaNodoRedCierra("cierra_span","T_TAG_SPAN",$2);};
content_span:
    content_span T_STRING {$$ = creaNodoRedEET("content_span",$1,"T_STRING",
$2);}
    | content_span tag_a {$$ = creaNodoRedEGG("content_span",$1,$2);}
    | content_span tag_b {$$ = creaNodoRedEGG("content_span",$1,$2);}
    | content_span br {$$ = creaNodoRedEGG("content_span",$1,$2);}
    | content_span button {$$ = creaNodoRedEGG("content_span",$1,$2);}
    | content_span em {$$ = creaNodoRedEGG("content_span",$1,$2);}
    | content_span img {$$ = creaNodoRedEGG("content_span",$1,$2);}
    | content_span input {$$ = creaNodoRedEGG("content_span",$1,$2);}
    | content_span object {$$ = creaNodoRedEGG("content_span",$1,$2);}
    | content_span script {$$ = creaNodoRedEGG("content_span",$1,$2);}
    | content_span span {$$ = creaNodoRedEGG("content_span",$1,$2);}
    | content_span strong {$$ = creaNodoRedEGG("content_span",$1,$2);}
    | content_span textarea {$$ = creaNodoRedEGG("content_span",$1,$2);}
    | {$$ = creaNodoRedVacía("content_span");}
;

```

```

strong: abre_strong content_strong cierra_strong {$$ = creaNodoRedEGGG("strong",
$1,$2,$3);};
abre_strong: T_TAG_OPEN T_TAG_STRONG atributos T_TAG_CLOSE {$$ =
creaNodoRedAbre("abre_strong","T_TAG_STRONG",$2,$3,"T_TAG_CLOSE",$4);};
cierra_strong: T_TAG_CLOSE_OPEN T_TAG_STRONG T_TAG_CLOSE {$$ =
creaNodoRedCierra("cierra_strong","T_TAG_STRONG",$2);};
content_strong:

```

```

content_strong T_STRING    {$$ = creaNodoRedEET("content_strong",$1,"T_STRING",
$2);}
| content_strong tag_a      {$$ = creaNodoRedEGG("content_strong",$1,$2);}
| content_strong tag_b      {$$ = creaNodoRedEGG("content_strong",$1,$2);}
| content_strong br         {$$ = creaNodoRedEGG("content_strong",$1,$2);}
| content_strong button     {$$ = creaNodoRedEGG("content_strong",$1,$2);}
| content_strong code       {$$ = creaNodoRedEGG("content_strong",$1,$2);}
| content_strong em         {$$ = creaNodoRedEGG("content_strong",$1,$2);}
| content_strong img        {$$ = creaNodoRedEGG("content_strong",$1,$2);}
| content_strong input      {$$ = creaNodoRedEGG("content_strong",$1,$2);}
| content_strong object     {$$ = creaNodoRedEGG("content_strong",$1,$2);}
| content_strong script     {$$ = creaNodoRedEGG("content_strong",$1,$2);}
| content_strong span       {$$ = creaNodoRedEGG("content_strong",$1,$2);}
| content_strong strong     {$$ = creaNodoRedEGG("content_strong",$1,$2);}
| content_strong style      {$$ = creaNodoRedEGG("content_strong",$1,$2);}
| content_strong textarea   {$$ = creaNodoRedEGG("content_strong",$1,$2);}
|      {$$ = creaNodoRedVacía("content_strong");}
;

```

```

style: abre_style content_style cierra_style {$$ = creaNodoRedEGGG("style",$1,$2,$3);}
abre_style:  T_TAG_OPEN  T_TAG_STYLE  atributos  T_TAG_CLOSE  {$$ =
creaNodoRedAbre("abre_style","T_TAG_STYLE",$2,$3,"T_TAG_CLOSE",$4);}
cierra_style:  T_TAG_CLOSE_OPEN  T_TAG_STYLE  T_TAG_CLOSE  {$$ =
creaNodoRedCierra("cierra_style","T_TAG_STYLE",$2);}
content_style:
    T_STRING content_style    {$$ = creaNodoRedETE("content_style","T_STRING",
$1,$2);}
    |      {$$ = creaNodoRedVacía("content_style");}
;

```

```

table: abre_table content_table cierra_table {$$ = creaNodoRedEGGG("table",$1,$2,$3);}
abre_table:  T_TAG_OPEN  T_TAG_TABLE  atributos  T_TAG_CLOSE  {$$ =
creaNodoRedAbre("abre_table","T_TAG_TABLE",$2,$3,"T_TAG_CLOSE",$4);}
cierra_table:  T_TAG_CLOSE_OPEN  T_TAG_TABLE  T_TAG_CLOSE  {$$ =
creaNodoRedCierra("cierra_table","T_TAG_TABLE",$2);}
content_table:
    tr content_table3    {$$ = creaNodoRedEGG("content_table",$1,$2);}
    | content_table2    {$$ = creaNodoRedEG("content_table",$1);}
;
content_table2:
    caption tr          {$$ = creaNodoRedEGG("content_table2",$1,$2);}
    | content_table2 tr  {$$ = creaNodoRedEGG("content_table2",$1,$2);}
;
content_table3:
    tr content_table3    {$$ = creaNodoRedEGG("content_table3",$1,$2);}
    |      {$$ = creaNodoRedVacía("content_table3");}
;

```

;

```
td: abre_td content_td cierra_td {$$ = creaNodoRedEGGG("td",$1,$2,$3);};
abre_td:      T_TAG_OPEN      T_TAG_TD      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_td","T_TAG_TD",$2,$3,"T_TAG_CLOSE",$4);};
cierra_td:      T_TAG_CLOSE_OPEN      T_TAG_TD      T_TAG_CLOSE      {$$      =
creaNodoRedCierra("cierra_td","T_TAG_TD",$2);};
content_td:
    content_td T_STRING      {$$ = creaNodoRedEET("content_td",$1,"T_STRING",$2);}
    | content_td tag_a      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td tag_b      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td blockquote      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td br      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td button      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td code      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td div      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td dl      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td em      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td form      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td h1      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td h2      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td h3      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td h4      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td h5      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td h6      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td hr      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td img      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td input      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td object      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td ol      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td tag_p      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td pre      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td script      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td span      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td strong      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td table      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td textarea      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    | content_td ul      {$$ = creaNodoRedEGG("content_td",$1,$2);}
    |      {$$ = creaNodoRedVacía("content_td");}
;
```

```
th: abre_th content_th cierra_th {$$ = creaNodoRedEGGG("th",$1,$2,$3);};
abre_th:      T_TAG_OPEN      T_TAG_TH      atributos      T_TAG_CLOSE      {$$      =
creaNodoRedAbre("abre_th","T_TAG_TH",$2,$3,"T_TAG_CLOSE",$4);};
cierra_th:      T_TAG_CLOSE_OPEN      T_TAG_TH      T_TAG_CLOSE      {$$      =
creaNodoRedCierra("cierra_th","T_TAG_TH",$2);};
```

content_th:

```
content_th T_STRING      {$$ = creaNodoRedEET("content_th",$1,"T_STRING",$2);}
| content_th tag_a      {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th tag_b      {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th blockquote {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th br         {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th button     {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th code       {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th div        {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th dl         {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th em         {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th form       {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th h1         {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th h2         {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th h3         {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th h4         {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th h5         {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th h6         {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th hr         {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th img        {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th input      {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th object     {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th ol         {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th tag_p      {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th pre        {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th script     {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th span       {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th strong     {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th table      {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th textarea   {$$ = creaNodoRedEGG("content_th",$1,$2);}
| content_th ul         {$$ = creaNodoRedEGG("content_th",$1,$2);}
|      {$$ = creaNodoRedVacía("content_th");}
;
```

tr: abre_tr content_tr cierra_tr {\$\$ = creaNodoRedEGGG("tr",\$1,\$2,\$3);};

abre_tr: T_TAG_OPEN T_TAG_TR atributos T_TAG_CLOSE {\$\$ = creaNodoRedAbre("abre_tr","T_TAG_TR",\$2,\$3,"T_TAG_CLOSE",\$4);};

cierra_tr: T_TAG_CLOSE_OPEN T_TAG_TR T_TAG_CLOSE {\$\$ = creaNodoRedCierra("cierra_tr","T_TAG_TR",\$2);};

content_tr:

```
td      {$$ = creaNodoRedEG("content_tr",$1);}
| th    {$$ = creaNodoRedEG("content_tr",$1);}
| content_tr td {$$ = creaNodoRedEGG("content_tr",$1,$2);}
| content_tr th {$$ = creaNodoRedEGG("content_tr",$1,$2);}
;
```



```

textarea: abre_textarea content_textarea cierra_textarea {$$ = creaNodoRedEGGG("textarea",
$1,$2,$3);};
abre_textarea: T_TAG_OPEN T_TAG_TEXTAREA atributos T_TAG_CLOSE {$$ =
creaNodoRedAbre("abre_textarea","T_TAG_TEXTAREA",$2,$3,"T_TAG_CLOSE",$4);};
cierra_textarea: T_TAG_CLOSE_OPEN T_TAG_TEXTAREA T_TAG_CLOSE {$$ =
creaNodoRedCierra("cierra_textarea","T_TAG_TEXTAREA",$2);};
content_textarea:
    content_textarea T_STRING {$$ = creaNodoRedEET("content_textarea",
$1,"T_STRING",$2);}
    | {$$ = creaNodoRedVacía("content_textarea");}
    ;

title: abre_title content_title cierra_title {$$ = creaNodoRedEGGG("title",$1,$2,$3);};
abre_title: T_TAG_OPEN T_TAG_TITLE atributos T_TAG_CLOSE {$$ =
creaNodoRedAbre("abre_title","T_TAG_TITLE",$2,$3,"T_TAG_CLOSE",$4);};
cierra_title: T_TAG_CLOSE_OPEN T_TAG_TITLE T_TAG_CLOSE {$$ =
creaNodoRedCierra("cierra_title","T_TAG_TITLE",$2);};
content_title:
    content_title T_STRING {$$ = creaNodoRedEET("content_title",$1,"T_STRING",
$2);}
    | {$$ = creaNodoRedVacía("content_title");}
    ;

ul: abre_ul content_ul cierra_ul {$$ = creaNodoRedEGGG("ul",$1,$2,$3);};
abre_ul: T_TAG_OPEN T_TAG_UL atributos T_TAG_CLOSE {$$ =
creaNodoRedAbre("abre_ul","T_TAG_UL",$2,$3,"T_TAG_CLOSE",$4);};
cierra_ul: T_TAG_CLOSE_OPEN T_TAG_UL T_TAG_CLOSE {$$ =
creaNodoRedCierra("cierra_ul","T_TAG_UL",$2);};
content_ul:
    li {$$ = creaNodoRedEG("content_ul",$1);}
    | content_ul li {$$ = creaNodoRedEGG("content_ul",$1,$2);}
    ;

atributos:
    atributos2 {$$ = creaNodoRedEG("atributos",$1);}
    | {$$ = creaNodoRedE("atributos");}
    ;
atributos2:
    atributo {$$ = creaNodoRedEG("atributos2",$1);}
    | atributo atributos2 {$$ = creaNodoRedEGG("atributos2",$1,$2);}
    ;
atributo: T_ATR T_IGUAL T_COMILLA value T_COMILLA {$$ = creaNodoRedAtr($1,$4);};

value:
    T_VALUE {$$ = creaNodoRedET("value","T_VALUE",$1);}
    | value T_VALUE {$$ = creaNodoRedEET("value",$1,"T_VALUE",$2);}

```

;

Luego se creó una estructura de nodo y una de lista para poder implementar un árbol para almacenar el parse tree generado por el analizador. Estas tienen la siguiente estructura:

```
/*Estructura de arbol que va a ser utilizada para construir el parse tree
posee un char* que almacena el nombre del nodo y una estructura lista
con una lista de sus nodos hijos*/
typedef struct nodo{
    char *str;
    struct lista *hijos;
} nodo;
/*Estructura lista, de la forma nodo,lista donde nodo es el nodo en esta
posicion de la lista y lista es la siguiente posicion */
typedef struct lista{
    nodo *node;
    struct lista *siguiente;
}lista;
```

Para poder solucionar el problema aparte de un main que abre el archivo que se envía al programa desde la línea de comandos y llamar a la función `yyparse()` se crearon los siguientes algoritmos.

```
//Se reescribe yyerror para que imprima mensajes mas completos de error
//indicando la linea y la columna
void yyerror (char const *s)
{
    fprintf (stderr, "Line: %d, col: %d %s\n", getLine_inicial(),getCol_inicial (), s);
}
```

Las siguientes funciones generarán la parte correspondiente al parse tree según la producción que se reduce. Esta parte del árbol es almacenada en la variable `$$` de Bison para cada producción. Además están los algoritmos para imprimir el árbol.

```
/*Algoritmo que crea un nodo nuevo, solicita a la memoria el espacio para el
nodo y para el arreglo de caracteres de su nombre, retorna el nodo*/
nodo *creaNodo (char *valor){
}
```

```
/*Agrega un hijo a la lista de hijos del padre, recibe el nodo padre y el
nodo hijo. Crea una estructura de tipo lista para el nodo hijo y lo agrega
en la ultima posicion a la estructura de hijos del padre*/
void agregaHijo(nodo *padre,nodo *hijo){
}
```

```
/*Algoritmo que imprime un arbol, donde va indentando segun el nivel de
cada nodo, a partir de un nodo padre. Imprime a un nodo y luego
recursivamente imprime sus hijos (imprime todos los hijos de cada nodo antes
de imprimir sus hermanos, de manera recursiva)*/
void imprimeNodos(nodo *padre,int nivel){
}
```

```
//Imprime el simbolo "|" tantas cantidades de veces equivalente a la profundidad
del nodo que imprime actualmente
//funciona como guia para entender mejor el arbol
void imprimeLinea(nivel){
}
```

```
/*Crea el arbol para los token, el arbol es de la forma TOKEN->valor
del token*/
nodo *creaNodoToken(char *token,char *val){
}
```

```
/*Crea la parte del arbol para reducciones de tipo E->T con E no terminal
y T terminal. El arbol tiene la forma E->TOKEN->valor del token*/
nodo *creaNodoRedET(char *prod,char *token,char *tira){
}
```

```
/*Crea la parte del arbol para reducciones de tipo E->ET con E no terminal
y T terminal. El arbol tiene la forma E->(E TOKEN) donde E y TOKEN
tienen su arbol respectivo*/
nodo *creaNodoRedEET(char *prod,nodo *arbol,char *token,char *tira){
}
```

```
/*Crea la parte del arbol para reducciones de tipo E->TE con E no terminal
y T terminal. El arbol tiene la forma E->(TOKEN E) donde E y TOKEN
tienen su arbol respectivo*/
nodo *creaNodoRedETE(char *prod,char *token,char *tira,nodo *arbol){
}
```

```
/*Crea la parte del arbol para la reduccion atributo cuyo caso es
```

particular. El arbol tiene la forma $E \rightarrow (T T T G T)$ donde E es la produccion atributo, T representa algun token en particular y G la produccion value, donde cada uno tiene su arbol respectivo*/
nodo *creaNodoRedAtr(char *atrb,nodo *val){
}

/*Crea la parte del arbol para reducciones de tipo $E \rightarrow GG$ con E no terminal y G otro no terminal donde los G pueden ser diferentes entre ellos, iguales o iguales a E. El arbol tiene la forma $E \rightarrow (G G)$ donde cada G tiene su arbol respectivo*/
nodo *creaNodoRedEGG(char *prod,nodo *hijo,nodo *hijo1){
}

/*Crea la parte del arbol para reducciones de tipo $E \rightarrow G$ con E no terminal y G otro no terminal. El arbol tiene la forma $E \rightarrow G$ donde G tiene su arbol respectivo*/
nodo *creaNodoRedEG(char *prod,nodo *hijo){
}

/*Crea la parte del arbol para reducciones de tipo $E \rightarrow \text{vacio}$ con E no terminal. El arbol tiene la forma $E \rightarrow \text{vacio}$ */
nodo *creaNodoRedE(char *prod){
}

/*Crea la parte del arbol para la reduccion de tipo cierra cuyo caso es particular. El arbol tiene la forma $E \rightarrow (T T T)$ donde T representa algun token en particular donde cada uno tiene su arbol respectivo*/
nodo *creaNodoRedCierra(char *prod,char *token,char *val){
}

/*Crea la parte del arbol para la reduccion de tipo abre cuyo caso es particular. El arbol tiene la forma $E \rightarrow (T T A T3)$ donde T representa algun token en particular y A los atributos donde cada uno tiene su arbol respectivo, el T3 puede ser > o /> */
nodo *creaNodoRedAbre(char *prod,char *token,char *val,nodo *hijo2,char *cierre,char *valCierre){
}

/*Crea la parte del arbol para reducciones de tipo $E \rightarrow GGG$ con E no terminal y G otros no terminales. El arbol tiene la forma $E \rightarrow (G G G)$ cada G tiene su arbol respectivo*/
nodo *creaNodoRedEGGG(char *prod,nodo *hijo,nodo *hijo1,nodo *hijo2){

```

}

/*Crea la parte del arbol para reducciones de tipo E->vacio
El arbol tiene la forma E->>() */
nodo *creaNodoRedVacia(char *prod){
}

```

Posteriormente, la impresión del árbol tiene una forma, la cual debe ser explicada. Dado que el menor caso de un documento sintácticamente correcto, posee un tamaño grande como para incluir en la documentación sólo se explicará una parte de este.

Para los nodos de a se tiene:

```

tag_a
| --abre_a
| | --T_TAG_OPEN
| | |--<
| | --T_TAG_A
| | |--a
| | --atributos
| | | --atributos2
| | | | --
| | | | --T_TAG_CLOSE
...

```

Esto indica que, abre_a es el único hijo de tag_a (dentro de lo que se puede observar). Abre_a posee cuatro hijos T_TAG_OPEN (cuyo hijo es < el cual es el string relacionado), T_TAG_A (posee hijo a, similar al caso de T_TAG_OPEN), atributos y T_TAG_CLOSE. Atributos posee un hijo el cual es atributos2 y este posee un hijo el cual es un nodo vacío, ya que en este caso no posee atributos la etiqueta a.

Se escogió Bison en lugar de YACC por las siguientes razones.

*Se mantiene la estructura vista en clase, en clase se observó un caso de ejemplo para esta herramienta.

*Previamente, para la primera tarea, ya se había instalada Bison ya que se había previsto la conexión de Bison y FLEX. Sin embargo, antes de la tarea la herramienta no se había utilizad.

No se utilizaron librerías externas.

Análisis de resultados:

El resultado general de la tarea programada se puede considerar un éxito, dado que se generó un parser que genera el parse tree relacionado de manera adecuada, para el documento que se le redirecciona el parser.

Sin embargo, haciendo un análisis más profundo se encuentra que:

Dado que se logró generar el parser, se logró comprender a profundidad la estructura del XHTML, en especial su estructura. Debido a esto se logró definir una gramática que crea un parser bottom up, para revisar si un documento es sintácticamente válido o no.

Aunque los mensajes de error indican la línea y columna y además dicen por qué se genera el error, no se considera que esta parte sea del todo como fue deseada. Por ejemplo, si se va a cerrar la etiqueta br de la manera `
</br>`, lo cuál es sintácticamente incorrecto, el mensaje en vez de ser algo como: etiqueta mal cerrada, o `>` inesperado, se esperaba `/>`; el mensaje es: `T_TAG_CLOSE` inesperado, se esperaba `T_TAG_CLOSE_CLOSE`.

En cuanto a tiempo, se realizó una distribución adecuada de este dado que no se presentaron problemas en cuanto a la finalización de la tarea después de la fecha límite, incluso hubo tiempo de sobra y no se tuvo que sacrificar tiempo de sueño o de otras tareas.

- ***Manual de usuario***

Una vez abierta la terminal, y al cambiar la dirección a la de la carpeta Parser_XHTML, sólo se deben de correr dos instrucciones para ejecutar el scanner.

El primero permite generar el archivo parser y consiste sólo de la instrucción:

make

Para correr el parser se escribe la siguiente instrucción, donde nombreArchivo corresponde al archivo xhtml al que se le desea realizar un análisis sintáctico.

./parser nombreArchivo

El parser imprimirá el parse tree relacionado al archivo o los errores si se presenta el caso

• ***Conclusión personal***

En sí, la tarea programada permitió reforzar los términos vistos en clase sobre parser bottom up, dando un refuerzo al contenido visto previamente. Además, permitió una comprensión más clara sobre el funcionamiento de analizador sintáctico y los algoritmos asociados.

A pesar de no ser considerada, una tarea programada tan pesada y que no representó una dificultad como otras previamente realizadas en cursos anteriores, debido a su naturaleza, en especial la necesidad de definir la gramática, se requirió de gran investigación y dedicación, para crear sin errores las producciones que generarías una estructura válida para un documento XHTML, ya que errores en esta sección, debido a ser tan extensa hubiera sido difícil solucionarlos, ya que se requiere gran dedicación para cambiar la estructura.

En cuanto al lenguaje, debido a que C posee un manejo de strings diferentes ya que estos consisten en arreglos de char y se debe manejar la memoria y alocar de manera correcta estos y hacer copias para evitar que se apunte a un arreglo de caracteres variable. Esto presentó grandes complicaciones ya que generaba segmentation fault y requirió tiempo para aprender a manejar todas estas alocaiones ya que no se tenía suficiente práctica con C. Sin embargo, fue un importante obstáculo que permitió que se conociera mejor C para futuros usos.

En conclusión, se considera que la tarea, posee todas las cualidades para ir de la mano con lo visto en clase y sirve como base para conocer un caso específico de parser, pero a su vez brinda una comprensión general de este.

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