

**TUGAS BESAR**  
**TEORI BAHASA FORMAL DAN AUTOMATA**  
**KELAS K3**



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## I. TEORI DASAR

Pada Tugas Besar ini, digunakan suatu bentuk automaton yaitu Pushdown Automata (PDA). PDA adalah suatu jenis automaton berupa e-NFA yang menggunakan stack pada pengaplikasiannya. Adanya stack digunakan untuk mengingat simbol yang dibaca sebelumnya pada setiap inputan yang dilakukan. Pada manipulasi stack di PDA, digunakan operasi push dan pop dengan PDA membaca elemen stack yang berada di atas. Secara formal, PDA bisa didefinisikan menjadi 7 bagian yaitu himpunan finite state, alfabet atau input simbol, himpunan simbol stack, himpunan transisi, initial state atau state awal, simbol awal pada initial stack, dan himpunan accepted state. PDA memiliki 2 cara untuk menentukan input yang diterima yaitu dengan final state dan dengan empty stack.

PDA digunakan pada Tugas Besar ini untuk melihat sintaks pada HTML. Apakah sintaks-sintaks pada file HTML diterima oleh program ditentukan oleh PDA yang dibuat. PDA dibuat menggunakan text file dengan pendefinisian alfabet, state, dan lainnya. PDA digunakan oleh program untuk meninjau sintaks-sintaks pada suatu file HTML. Program yang digunakan membaca file HTML serta file PDA sehingga dapat melihat apakah sintaks yang digunakan di file HTML yang ditinjau sudah benar atau belum. Apabila sudah benar, program mengeluarkan output yang menunjukkan sintaks yang digunakan sudah benar. Apabila belum benar, program mengeluarkan output yang menunjukkan sintaks yang digunakan belum benar.

## II. HASIL PDA

PDA yang digunakan adalah PDA yang menerima final state. Hal tersebut dilakukan dengan pendefinisian state pada PDA dengan adanya start state dan final state. Sebagai start state, PDA bermula dari start html dan menerima serta membaca sintak-sintaks pada file HTML sehingga akan menjalani fungsi-fungsi transisi yang menentukan apakah suatu input diterima oleh PDA tersebut atau tidak. Apabila PDA menerima sintaks pada file HTML yang dibaca, PDA akan berakhir di state body final sebagai final state.

Untuk spesifikasi PDA yang digunakan adalah sebagai berikut.

```
START HTML HEAD BODY /HEAD /BODY /HTML FINAL
T > " <!-- --> <html </html <head </head <title </title <link <script
</script rel=" href=" src=" id=" class=" style=" <body </body <h1 </h1
<h2 </h2 <h3 </h3 <h4 </h4 <h5 </h5 <h6 </h6 <p </p <a </a <hr <br <em
</em <b </b <abbr </abbr <strong </strong <small </small <div </div <img
<button </button <form </form <input <table </table <tr </tr <td </td
<th </th
Z > " <!-- --> <html </html <head </head <title </title <link <script
</script OATscript rel=" src=" <body </body <h1 </h1 <h2 </h2 <h3 </h3
```

```

<h4 </h4 <h5 </h5 <h6 </h6 <p </p <A </A OATa <B </B <br <em </em <abbr
</abbr <strong </strong <small </small <div </div <img <button </button
TYPEB OATb <form </form OATf METHODf <input TYPEi <table </table <tr
</tr <td </td <th </th
START
Z
FINAL
# $ adalah epsilon, jika simbol stack punya OAT, artinya tag punya
atribut tambahan
# %%%%%%%%%%%%%% START %%%%%%%%%%%%%% #
START <html Z HTML ><head></head><body></body></html>Z
START <!-- Z START <!--Z
START --> <!-- START $
# %%%%%%%%%%%%%% HTML %%%%%%%%%%%%%% #
HTML > > HEAD $
HTML " " HTML $
# ===== global attributes (general) ===== #
HTML id=" " > HTML ">
HTML class=" " > HTML ">
HTML style=" " > HTML ">
# %%%%%%%%%%%%%% HEAD %%%%%%%%%%%%%% #
# ===== COMMENT ===== #
HEAD <!-- <head HEAD <!--<head
HEAD <!-- </head HEAD <!--</head
HEAD <!-- <title HEAD <!--<title
HEAD <!-- <script HEAD <!--<script
HEAD --> <!-- HEAD $
# ===== Text between tags ===== #
HEAD T <title HEAD <title
HEAD T <script HEAD <script
# ===== General ===== #
HEAD <head <head HEAD $
HEAD > > HEAD $
HEAD " " HEAD $
HEAD T " HEAD "
# ===== title ===== #
HEAD <title </head HEAD ><title</head
HEAD </title <title HEAD </title
HEAD > </title HEAD $
# ===== link ===== #
HEAD <link </head HEAD rel="<link</head
HEAD rel=" rel=" HEAD "
HEAD href=" <link HEAD "<link
HEAD > <link HEAD $
# ===== script ===== #
HEAD <script </head HEAD OATscript<script</head
HEAD src=" OATscript HEAD "OATscript
HEAD > OATscript HEAD $

```

```

HEAD </script <script HEAD </script
HEAD > </script HEAD $
# ===== global attributes (general) ===== #
HEAD id=" > HEAD ">
HEAD class=" > HEAD ">
HEAD style=" > HEAD ">
# ===== global attributes (has optional attributes or nest) ===== #
HEAD id=" <link HEAD "<link
HEAD class=" <link HEAD "<link
HEAD style=" <link HEAD "<link
HEAD id=" OATscript HEAD "OATscript
HEAD class=" OATscript HEAD "OATscript
HEAD style=" OATscript HEAD "OATscript
# %%%%%%%%%%%%%%% /HEAD %%%%%%%%%%%%%%% #
HEAD </head </head /HEAD $
/HEAD > > BODY $
# %%%%%%%%%%%%%%% BODY %%%%%%%%%%%%%%% #
# ===== COMMENTS ===== #
BODY <!-- <head BODY <!--<head
BODY <!-- </head BODY <!--</head
BODY <!-- <title BODY <!--<title
BODY <!-- <script BODY <!--<script
BODY <!-- <h1 BODY <!--<h1
BODY <!-- <h2 BODY <!--<h2
BODY <!-- <h3 BODY <!--<h3
BODY <!-- <h4 BODY <!--<h4
BODY <!-- <h5 BODY <!--<h5
BODY <!-- <h6 BODY <!--<h6
BODY <!-- <p BODY <!--<p
BODY <!-- <A BODY <!--<A
BODY <!-- <B BODY <!--<B
BODY <!-- <em BODY <!--<em
BODY <!-- <abbr BODY <!--<abbr
BODY <!-- <strong BODY <!--<strong
BODY <!-- <small BODY <!--<small
BODY <!-- <div BODY <!--<div
BODY <!-- <button BODY <!--<button
BODY <!-- <form BODY <!--<form
BODY <!-- <table BODY <!--<table
BODY <!-- <tr BODY <!--<tr
BODY <!-- <td BODY <!--<td
BODY <!-- <th BODY <!--<th
BODY --> <!-- BODY $
# ===== TEXT ===== #
BODY T <title BODY <title
BODY T <script BODY <script
BODY T <h1 BODY <h1
BODY T <h2 BODY <h2

```

```

BODY T <h3 BODY <h3
BODY T <h4 BODY <h4
BODY T <h5 BODY <h5
BODY T <h6 BODY <h6
BODY T <p BODY <p
BODY T <A BODY <A
BODY T <B BODY <B
BODY T <em BODY <em
BODY T <abbr BODY <abbr
BODY T <strong BODY <strong
BODY T <small BODY <small
BODY T <div BODY <div
BODY T <button BODY <button
BODY T <form BODY <form
BODY T <table BODY <table
BODY T <tr BODY <tr
BODY T <td BODY <td
BODY T <th BODY <th
# ===== General ===== #
BODY <body <body BODY $
BODY > > BODY $
BODY " " BODY $
# ===== global attributes (general) ===== #
BODY id=" " > BODY ">
BODY class=" " > BODY ">
BODY style=" " > BODY ">
# ===== link ===== #
BODY <link </body BODY rel="<link</body
BODY rel=" rel=" BODY "
BODY href=" <link BODY "<link
BODY > <link BODY $
BODY id=" <link BODY "<link
BODY class=" <link BODY "<link
BODY style=" <link BODY "<link
# ===== script ===== #
BODY <script </body BODY OATscript<script</body
BODY src=" OATscript BODY "OATscript
BODY > OATscript BODY $
BODY </script <script BODY </script
BODY > </script BODY $
BODY id=" OATscript BODY "OATscript
BODY class=" OATscript BODY "OATscript
BODY style=" OATscript BODY "OATscript
# ===== header ===== #
BODY <h1 </body BODY ><h1</body
BODY </h1 <h1 BODY </h1
BODY > </h1 BODY $
BODY <h2 </body BODY ><h2</body

```

```

BODY </h2 <h2 BODY </h2
BODY > </h2 BODY $
BODY <h3 </body BODY ><h3</body
BODY </h3 <h3 BODY </h3
BODY > </h3 BODY $
BODY <h4 </body BODY ><h4</body
BODY </h4 <h4 BODY </h4
BODY > </h4 BODY $
BODY <h5 </body BODY ><h5</body
BODY </h5 <h5 BODY </h5
BODY > </h5 BODY $
BODY <h6 </body BODY ><h6</body
BODY </h6 <h6 BODY </h6
BODY > </h6 BODY $
# ===== paragraph ===== #
BODY <p </body BODY ><p</body
BODY </p <p BODY </p
BODY > </p BODY $
# ===== br ===== #
BODY <br </body BODY <br</body
BODY <br </p BODY <br</p
BODY <br </A BODY <br</A
BODY <br </h1 BODY <br</h1
BODY <br </h2 BODY <br</h2
BODY <br </h3 BODY <br</h3
BODY <br </h4 BODY <br</h4
BODY <br </h5 BODY <br</h5
BODY <br </h6 BODY <br</h6
BODY > <br BODY $
# ===== formatting elements (inside paragraph, header, and anchor only)
===== #
# ===== em ===== #
BODY <em </p BODY ><em</p
BODY <em </A BODY ><em</A
BODY <em </h1 BODY ><em</h1
BODY <em </h2 BODY ><em</h2
BODY <em </h3 BODY ><em</h3
BODY <em </h4 BODY ><em</h4
BODY <em </h5 BODY ><em</h5
BODY <em </h6 BODY ><em</h6
BODY </em <em BODY </em
BODY > </em BODY $
# ===== bold ===== #
BODY <b </p BODY ><B</p
BODY <b </A BODY ><B</A
BODY <b </h1 BODY ><B</h1
BODY <b </h2 BODY ><B</h2
BODY <b </h3 BODY ><B</h3

```

```

BODY <b </h4 BODY ><B</h4
BODY <b </h5 BODY ><B</h5
BODY <b </h6 BODY ><B</h6
BODY </b <b BODY </B
BODY > </B BODY $
# ===== abbr ===== #
BODY <abbr </p BODY ><abbr</p
BODY <abbr </A BODY ><abbr</A
BODY <abbr </h1 BODY ><abbr</h1
BODY <abbr </h2 BODY ><abbr</h2
BODY <abbr </h3 BODY ><abbr</h3
BODY <abbr </h4 BODY ><abbr</h4
BODY <abbr </h5 BODY ><abbr</h5
BODY <abbr </h6 BODY ><abbr</h6
BODY </abbr <abbr BODY </abbr
BODY > </abbr BODY $
# ===== strong ===== #
BODY <strong </p BODY ><strong</p
BODY <strong </A BODY ><strong</A
BODY <strong </h1 BODY ><strong</h1
BODY <strong </h2 BODY ><strong</h2
BODY <strong </h3 BODY ><strong</h3
BODY <strong </h4 BODY ><strong</h4
BODY <strong </h5 BODY ><strong</h5
BODY <strong </h6 BODY ><strong</h6
BODY </strong <abbr BODY </strong
BODY > </strong BODY $
# ===== small ===== #
BODY <small </p BODY ><small</p
BODY <small </A BODY ><small</A
BODY <small </h1 BODY ><small</h1
BODY <small </h2 BODY ><small</h2
BODY <small </h3 BODY ><small</h3
BODY <small </h4 BODY ><small</h4
BODY <small </h5 BODY ><small</h5
BODY <small </h6 BODY ><small</h6
BODY </small <abbr BODY </small
BODY > </small BODY $
# ===== end of formatting elements ===== #
# ===== hr ===== #
BODY <hr </body BODY ></body
# ===== div ===== #
BODY <div </body BODY ><div</body
BODY <p <div BODY ><p<div
BODY <a <div BODY OATa<A<div
BODY <h1 <div BODY ><h1<div
BODY <h2 <div BODY ><h2<div
BODY <h3 <div BODY ><h3<div

```

```

BODY <h4 <div BODY ><h4<div
BODY <h5 <div BODY ><h5<div
BODY <h6 <div BODY ><h6<div
BODY <div <div BODY ><div<div
BODY </div <div BODY </div
BODY > </div BODY $
# ===== anchor ===== #
BODY <a </body BODY OATa<A</body
BODY href=" OATa BODY "OATa
BODY > OATa BODY $
BODY </a <A BODY </A
BODY > </A BODY $
# ===== img ===== #
BODY  <img BODY $
# ===== button ===== #
BODY <button </body BODY OATb</body
BODY id=" OATb BODY "OATb
BODY class=" OATb BODY "OATb
BODY style=" OATb BODY "OATb
BODY type=" OATb BODY TYPEB"OATb
BODY submit TYPEB BODY $
BODY reset TYPEB BODY $
BODY button TYPEB BODY $
BODY > OATb BODY <button
BODY </button <button BODY </button
BODY > </button BODY $
# ===== form ===== #
BODY <form </body BODY OATf<body
BODY id=" OATf BODY "OATf
BODY class=" OATf BODY "OATf
BODY style=" OATf BODY "OATf
BODY action=" OATf BODY "OATf
BODY method=" OATf BODY METHODf"OATf
BODY GET METHODf BODY $
BODY get METHODf BODY $
BODY POST METHODf BODY $
BODY post METHODf BODY $
BODY > OATf BODY <form
BODY <input <form BODY <input<form
BODY <button <form BODY OATb<form
BODY </form <form BODY </form
BODY > </form BODY $

```



```

# ===== input ===== #
BODY <input </body BODY <input</body
BODY id=" <input BODY "<input
BODY class=" <input BODY "<input
BODY style=" <input BODY "<input
BODY type=" <input BODY TYPEi"<input
BODY text TYPEi BODY $
BODY password TYPEi BODY $
BODY email TYPEi BODY $
BODY number TYPEi BODY $
BODY checkbox TYPEi BODY $
BODY > <input BODY $
# ===== table ===== #
BODY <table </body BODY ><table</body
BODY </table <table BODY </table
BODY > </table BODY $
# ===== tr ===== #
BODY <tr <table BODY ><tr<table
BODY </tr <tr BODY </tr
BODY > </tr BODY $
# ===== td ===== #
BODY <td <tr BODY ><td<tr
BODY </td <td BODY </td
BODY > </td BODY $
# ===== th ===== #
BODY <th <tr BODY ><th<tr
BODY </th <th BODY </th
BODY > </th BODY $
# %%%%%%%%%%%%%%% /BODY %%%%%%%%%%%%%%% #
BODY </body </body /BODY $
/BODY > > /HTML $
# %%%%%%%%%%%%%%% /HTML %%%%%%%%%%%%%%% #
/HTML <!-- </html /HTML <!--</html
/HTML --> <!-- HEAD $
/HTML </html </html /HTML $
/HTML > > FINAL $
FINAL <!-- Z FINAL <!--Z
FINAL --> <!-- FINAL $

```

PDA yang digunakan bisa dinyatakan dengan 7-tuple yaitu  $(Q, \Sigma, \Gamma, \delta, q_0, Z_0, F)$  dengan  $Q$  adalah jumlah state,  $\Sigma$  adalah jumlah alfabet yang digunakan,  $\Gamma$  adalah semua stack symbol yang digunakan,  $\delta$  adalah fungsi transisi,  $q_0$  adalah start state,  $Z_0$  adalah start stack symbol, dan  $F$  adalah final state.

Untuk spesifikasi PDA ini adalah sebagai berikut.

#### 1. Jumlah State

- START , HTML , HEAD , BODY , /HEAD , /BODY , /HTML , FINAL

## 2. Jumlah Alfabet

- `> , " , <html, </html , <head , </head , <title , </title, <link , <script , </script , rel=" , href=" , src=" , id=" , class=" , style=" , <body , </body`

## 3. Stack Symbol

- `Z , > , " , <html, </html , <head , </head , <title , </title , <link , <script , </script , rel=" , href=" , src=" , id=" , class=" , style=" , <body , </body`

## 4. Start State

- `START`

## 5. Start Stack Symbol

- `Z`

## 6. Final State

- `FINAL`

PDA ini memiliki beberapa fungsi transisi. Berikut ini adalah fungsi transisi pada PDA dengan lengkap.

### 1. HTML

- $\delta(\text{HTML}, >, >) = \{ (\text{HEAD}, \$) \}$

### 2. HEAD

#### A. Biasa

- $\delta(\text{HEAD}, <\text{head}, <\text{head}) = \{ (\text{HEAD}, \$) \}$
- $\delta(\text{HEAD}, >, >) = \{ (\text{HEAD}, \$) \}$
- $\delta(\text{HEAD}, ", ") = \{ (\text{HEAD}, \$) \}$

#### B. Title

- $\delta(\text{HEAD}, <\text{title}, </\text{head}) = \{ (\text{HEAD}, ><\text{title}</\text{head}) \}$
- $\delta(\text{HEAD}, </\text{title}, <\text{title}) = \{ (\text{HEAD}, </\text{title}) \}$
- $\delta(\text{HEAD}, >, </\text{title}) = \{ (\text{HEAD}, \$) \}$

#### C. Link

- $\delta(\text{HEAD}, <\text{link}, </\text{head}) = \{ (\text{HEAD}, \text{rel}="<\text{link}</\text{head}), \}$
- $\delta(\text{HEAD}, \text{rel}=", \text{rel}=") = \{ (\text{HEAD}, ") \}$
- $\delta(\text{HEAD}, \text{href}=", <\text{link}) = \{ (\text{HEAD}, "<\text{link}) \}$
- $\delta(\text{HEAD}, >, <\text{link}) = \{ (\text{HEAD}, \$) \}$

#### D. Script

- $\delta(\text{HEAD}, <\text{script}, </\text{head}) = \{ (\text{HEAD}, \text{OATscript}<\text{script}</\text{head}) \}$
- $\delta(\text{HEAD}, \text{src}=", \text{OATscript}) = \{ (\text{HEAD}, "\text{OATscript}) \}$
- $\delta(\text{HEAD}, >, \text{OATscript}) = \{ (\text{HEAD}, \$) \}$
- $\delta(\text{HEAD}, </\text{script}, <\text{script}) = \{ (\text{HEAD}, </\text{script}) \}$
- $\delta(\text{HEAD}, >, </\text{script}) = \{ (\text{HEAD}, \$) \}$

#### E. Global Attributes (general)

- $\delta(\text{HEAD}, \text{id}=", >) = \{ (\text{HEAD}, ">) \}$
- $\delta(\text{HEAD}, \text{class}=", >) = \{ (\text{HEAD}, ">) \}$
- $\delta(\text{HEAD}, \text{style}=", >) = \{ (\text{HEAD}, ">) \}$

#### F. Global Attributes (has optional attributes or nest)

- $\delta(\text{HEAD}, \text{id}=", <\text{link}) = \{ (\text{HEAD}, "<\text{link}) \}$
- $\delta(\text{HEAD}, \text{class}=", <\text{link}) = \{ (\text{HEAD}, "<\text{link}) \}$
- $\delta(\text{HEAD}, \text{style}=", <\text{link}) = \{ (\text{HEAD}, "<\text{link}) \}$
- $\delta(\text{HEAD}, \text{id}=", <\text{script}) = \{ (\text{HEAD}, "<\text{script}) \}$
- $\delta(\text{HEAD}, \text{class}=", <\text{script}) = \{ (\text{HEAD}, "<\text{script}) \}$
- $\delta(\text{HEAD}, \text{style}=", <\text{script}) = \{ (\text{HEAD}, "<\text{script}) \}$

### 3. /HEAD

- $\delta(\text{HEAD}, </\text{head}, </\text{head}) = \{ / \text{HEAD}, \$ \}$
- $\delta(/ \text{HEAD}, >, >) = \{ (\text{BODY}, \$) \}$

### 4. BODY

#### A. Biasa

- $\delta(\text{BODY}, <\text{body}, <\text{body}) = \{ (\text{BODY}, \$) \}$
- $\delta(\text{BODY}, >, >) = \{ (\text{BODY}, \$) \}$
- $\delta(\text{BODY}, ", ") = \{ (\text{BODY}, \$) \}$

#### B. Global Attributes (general)

- $\delta(\text{BODY}, \text{id}=", >) = \{ (\text{BODY}, ">) \}$
- $\delta(\text{BODY}, \text{class}=", >) = \{ (\text{BODY}, ">) \}$
- $\delta(\text{BODY}, \text{style}=", >) = \{ (\text{BODY}, ">) \}$

#### C. Link

- $\delta(\text{BODY}, <\text{link}, </\text{body}) = \{ (\text{BODY}, \text{rel}="<\text{link}</\text{body}) \}$
- $\delta(\text{BODY}, \text{rel}=", \text{rel}=") = \{ (\text{BODY}, ") \}$
- $\delta(\text{BODY}, \text{href}=", <\text{link}) = \{ (\text{BODY}, ">) \}$
- $\delta(\text{BODY}, \text{style}=", >) = \{ (\text{BODY}, "<\text{link}) \}$
- $\delta(\text{BODY}, >, <\text{link}) = \{ (\text{BODY}, \$) \}$
- $\delta(\text{BODY}, \text{id}=", <\text{link}) = \{ (\text{BODY}, "<\text{link}) \}$
- $\delta(\text{BODY}, \text{class}=", <\text{link}) = \{ (\text{BODY}, "<\text{link}) \}$
- $\delta(\text{BODY}, \text{style}=", <\text{link}) = \{ (\text{BODY}, "<\text{link}) \}$

#### D. Script

- $\delta(\text{BODY}, <\text{script}, </\text{body}) = \{ (\text{BODY}, <\text{script}<\text{script}</\text{body}) \}$
- $\delta(\text{BODY}, \text{src}=", <\text{script}) = \{ (\text{BODY}, "<\text{script}) \}$
- $\delta(\text{BODY}, >, <\text{script}) = \{ (\text{BODY}, \$) \}$
- $\delta(\text{BODY}, </\text{script}, <\text{script}) = \{ (\text{BODY}, </\text{script}) \}$
- $\delta(\text{BODY}, >, </\text{script}) = \{ (\text{BODY}, \$) \}$
- $\delta(\text{BODY}, \text{id}=", <\text{script}) = \{ (\text{BODY}, "<\text{script}) \}$
- $\delta(\text{BODY}, \text{class}=", <\text{script}) = \{ (\text{BODY}, "<\text{script}) \}$
- $\delta(\text{BODY}, \text{style}=", <\text{script}) = \{ (\text{BODY}, "<\text{script}) \}$

#### E. Header

- $\delta(\text{BODY}, <\text{h1}, </\text{body}) = \{ (\text{BODY}, ><\text{h1}</\text{body}) \}$
- $\delta(\text{BODY}, </\text{h1}, <\text{h1}) = \{ (\text{BODY}, </\text{h1}) \}$
- $\delta(\text{BODY}, >, </\text{h1}) = \{ (\text{BODY}, \$) \}$
- $\delta(\text{BODY}, <\text{h2}, </\text{body}) = \{ (\text{BODY}, ><\text{h2}</\text{body}) \}$
- $\delta(\text{BODY}, </\text{h2}, <\text{h2}) = \{ (\text{BODY}, </\text{h2}) \}$
- $\delta(\text{BODY}, >, </\text{h2}) = \{ (\text{BODY}, \$) \}$

- $\delta(\text{BODY}, \text{<h3}, \text{</body}) = \{ (\text{BODY}, \text{><h3</body}) \}$
- $\delta(\text{BODY}, \text{</h3}, \text{<h3}) = \{ (\text{BODY}, \text{</h3}) \}$
- $\delta(\text{BODY}, \text{>}, \text{</h3}) = \{ (\text{BODY}, \$) \}$
- $\delta(\text{BODY}, \text{<h4 </body}) = \{ (\text{BODY}, \text{</h4}) \}$
- $\delta(\text{BODY}, \text{</h4 <h4}) = \{ (\text{BODY}, \text{</h4}) \}$
- $\delta(\text{BODY}, \text{> </h4}) = \{ (\text{BODY}, \$) \}$
- $\delta(\text{BODY}, \text{<h5 </body}) = \{ (\text{BODY}, \text{><h5</body}) \}$
- $\delta(\text{BODY}, \text{</h5 <h5}) = \{ (\text{BODY}, \text{</h5}) \}$
- $\delta(\text{BODY}, \text{> </h5}) = \{ (\text{BODY}, \$) \}$
- $\delta(\text{BODY}, \text{<h6 </body}) = \{ (\text{BODY}, \text{><h6</body}) \}$
- $\delta(\text{BODY}, \text{</h6 <h6}) = \{ (\text{BODY}, \text{</h6}) \}$
- $\delta(\text{BODY}, \text{> </h6}) = \{ (\text{BODY}, \$) \}$

#### F. Paragraph

- $\delta(\text{BODY}, \text{<p </body}) = \{ (\text{BODY}, \text{><p</body}) \}$
- $\delta(\text{BODY}, \text{</p <p}) = \{ (\text{BODY}, \text{</p}) \}$
- $\delta(\text{BODY}, \text{> </p}) = \{ (\text{BODY}, \$) \}$

#### G. br

- $\delta(\text{BODY}, \text{<br </body}) = \{ (\text{BODY}, \text{<br</body}) \}$
- $\delta(\text{BODY}, \text{<br </p}) = \{ (\text{BODY}, \text{<br</p}) \}$
- $\delta(\text{BODY}, \text{<br </A}) = \{ (\text{BODY}, \text{<br</A}) \}$
- $\delta(\text{BODY}, \text{<br </h1}) = \{ (\text{BODY}, \text{<br</h1}) \}$
- $\delta(\text{BODY}, \text{<br </h2}) = \{ (\text{BODY}, \text{<br</h2}) \}$
- $\delta(\text{BODY}, \text{<br </h3}) = \{ (\text{BODY}, \text{<br</h3}) \}$
- $\delta(\text{BODY}, \text{<br </h4}) = \{ (\text{BODY}, \text{<br</h4}) \}$
- $\delta(\text{BODY}, \text{<br </h5}) = \{ (\text{BODY}, \text{<br</h5}) \}$
- $\delta(\text{BODY}, \text{<br </h6}) = \{ (\text{BODY}, \text{<br </h6}) \}$

#### H. em

- $\delta(\text{BODY}, \text{<em </p}) = \{ (\text{BODY}, \text{><em</p}) \}$
- $\delta(\text{BODY}, \text{<em </A}) = \{ (\text{BODY}, \text{><em</A}) \}$
- $\delta(\text{BODY}, \text{<em </h1}) = \{ (\text{BODY}, \text{><em</h1}) \}$
- $\delta(\text{BODY}, \text{<em </h2}) = \{ (\text{BODY}, \text{><em</h2}) \}$
- $\delta(\text{BODY}, \text{<em </h3}) = \{ (\text{BODY}, \text{><em</h3}) \}$
- $\delta(\text{BODY}, \text{<em </h4}) = \{ (\text{BODY}, \text{><em</h4}) \}$
- $\delta(\text{BODY}, \text{<em </h5}) = \{ (\text{BODY}, \text{><em</h5}) \}$
- $\delta(\text{BODY}, \text{<em </h6}) = \{ (\text{BODY}, \text{><em</h6}) \}$
- $\delta(\text{BODY}, \text{</em <em}) = \{ (\text{BODY}, \text{</em}) \}$
- $\delta(\text{BODY}, \text{> </em}) = \{ (\text{BODY}, \$) \}$

#### I. Bold

- $\delta(\text{BODY}, \text{<b </p}) = \{ (\text{BODY}, \text{><B</p}) \}$
- $\delta(\text{BODY}, \text{<b </A}) = \{ (\text{BODY}, \text{><B</A}) \}$
- $\delta(\text{BODY}, \text{<b </h1}) = \{ (\text{BODY}, \text{><B</h1}) \}$
- $\delta(\text{BODY}, \text{<b </h2}) = \{ (\text{BODY}, \text{><B</h2}) \}$
- $\delta(\text{BODY}, \text{<b </h3}) = \{ (\text{BODY}, \text{><B</h3}) \}$
- $\delta(\text{BODY}, \text{<b </h4}) = \{ (\text{BODY}, \text{><B</h4}) \}$
- $\delta(\text{BODY}, \text{<b </h5}) = \{ (\text{BODY}, \text{><B</h5}) \}$

- $\delta(\text{BODY}, \text{<b </h6}) = \{ (\text{BODY}, \text{>B</h6}) \}$
- $\delta(\text{BODY}, \text{</b <b}) = \{ (\text{BODY}, \text{</B}) \}$
- $\delta(\text{BODY}, \text{> </B}) = \{ (\text{BODY}, \$) \}$

#### J. abbr

- $\delta(\text{BODY}, \text{<abbr </p}) = \{ (\text{BODY}, \text{>abbr</p}) \}$
- $\delta(\text{BODY}, \text{<abbr </A}) = \{ (\text{BODY}, \text{>abbr</A}) \}$
- $\delta(\text{BODY}, \text{<abbr </h1}) = \{ (\text{BODY}, \text{>abbr</h1}) \}$
- $\delta(\text{BODY}, \text{<abbr </h2}) = \{ (\text{BODY}, \text{>abbr</h2}) \}$
- $\delta(\text{BODY}, \text{<abbr </h3}) = \{ (\text{BODY}, \text{>abbr</h3}) \}$
- $\delta(\text{BODY}, \text{<abbr </h4}) = \{ (\text{BODY}, \text{>abbr</h4}) \}$
- $\delta(\text{BODY}, \text{<abbr </h5}) = \{ (\text{BODY}, \text{>abbr</h5}) \}$
- $\delta(\text{BODY}, \text{<abbr </h6}) = \{ (\text{BODY}, \text{>abbr</h6}) \}$
- $\delta(\text{BODY}, \text{</abbr <abbr}) = \{ (\text{BODY}, \text{</abbr}) \}$
- $\delta(\text{BODY}, \text{> </abbr}) = \{ (\text{BODY}, \$) \}$

#### K. Strong

- $\delta(\text{BODY}, \text{<strong </p}) = \{ (\text{BODY}, \text{>strong</p}) \}$
- $\delta(\text{BODY}, \text{<strong </A}) = \{ (\text{BODY}, \text{>strong</A}) \}$
- $\delta(\text{BODY}, \text{<strong </h1}) = \{ (\text{BODY}, \text{>strong</h1}) \}$
- $\delta(\text{BODY}, \text{<strong </h2}) = \{ (\text{BODY}, \text{>strong</h2}) \}$
- $\delta(\text{BODY}, \text{<strong </h3}) = \{ (\text{BODY}, \text{>strong</h3}) \}$
- $\delta(\text{BODY}, \text{<strong </h4}) = \{ (\text{BODY}, \text{>strong</h4}) \}$
- $\delta(\text{BODY}, \text{<strong </h5}) = \{ (\text{BODY}, \text{>strong</h5}) \}$
- $\delta(\text{BODY}, \text{<strong </h6}) = \{ (\text{BODY}, \text{>strong</h6}) \}$
- $\delta(\text{BODY}, \text{</strong <abbr}) = \{ (\text{BODY}, \text{</strong}) \}$
- $\delta(\text{BODY}, \text{> </strong}) = \{ (\text{BODY}, \$) \}$

#### L. Small

- $\delta(\text{BODY}, \text{<small </p}) = \{ (\text{BODY}, \text{>small</p}) \}$
- $\delta(\text{BODY}, \text{<small </A}) = \{ (\text{BODY}, \text{>small</A}) \}$
- $\delta(\text{BODY}, \text{<small </h1}) = \{ (\text{BODY}, \text{>small</h1}) \}$
- $\delta(\text{BODY}, \text{<small </h2}) = \{ (\text{BODY}, \text{>small</h2}) \}$
- $\delta(\text{BODY}, \text{<small </h3}) = \{ (\text{BODY}, \text{>small</h3}) \}$
- $\delta(\text{BODY}, \text{<small </h4}) = \{ (\text{BODY}, \text{>small</h4}) \}$
- $\delta(\text{BODY}, \text{<small </h5}) = \{ (\text{BODY}, \text{>small</h5}) \}$
- $\delta(\text{BODY}, \text{<small </h6}) = \{ (\text{BODY}, \text{>small</h6}) \}$
- $\delta(\text{BODY}, \text{</small <abbr}) = \{ (\text{BODY}, \text{</small}) \}$
- $\delta(\text{BODY}, \text{> </small}) = \{ (\text{BODY}, \$) \}$

#### M. hr

- $\delta(\text{BODY}, \text{<hr </body}) = \{ (\text{BODY}, \text{></body}) \}$

#### N. Div

- $\delta(\text{BODY}, \text{<div </body}) = \{ (\text{BODY}, \text{><div</body}) \}$
- $\delta(\text{BODY}, \text{> >}) = \{ (\text{BODY}, \$) \}$
- $\delta(\text{BODY}, \text{<p <div}) = \{ (\text{BODY}, \text{>p<div}) \}$
- $\delta(\text{BODY}, \text{<a <div}) = \{ (\text{BODY}, \text{OATa<A<div}) \}$
- $\delta(\text{BODY}, \text{<h1 <div}) = \{ (\text{BODY}, \text{>h1<div}) \}$

- $\delta(\text{BODY}, \text{<h2 <div}) = \{ (\text{BODY}, \text{><h2<div}) \}$
- $\delta(\text{BODY}, \text{<h3 <div}) = \{ (\text{BODY}, \text{><h3<div}) \}$
- $\delta(\text{BODY}, \text{<h4 <div}) = \{ (\text{BODY}, \text{><h4<div}) \}$
- $\delta(\text{BODY}, \text{<h5 <div}) = \{ (\text{BODY}, \text{><h5<div}) \}$
- $\delta(\text{BODY}, \text{<h6 <div}) = \{ (\text{BODY}, \text{><h6<div}) \}$
- $\delta(\text{BODY}, \text{<div <div}) = \{ (\text{BODY}, \text{><div<div}) \}$
- $\delta(\text{BODY}, \text{</div <div}) = \{ (\text{BODY}, \text{</div}) \}$
- $\delta(\text{BODY}, \text{> </div}) = \{ (\text{BODY}, \$) \}$

#### O. Anchor

- $\delta(\text{BODY}, \text{<a </body}) = \{ (\text{BODY}, \text{OATa<A</body}) \}$
- $\delta(\text{BODY}, \text{href=" OATa}) = \{ (\text{BODY}, \text{"OATa}) \}$
- $\delta(\text{BODY}, \text{> OATa}) = \{ (\text{BODY}, \$) \}$
- $\delta(\text{BODY}, \text{</a <A}) = \{ (\text{BODY}, \text{</A}) \}$
- $\delta(\text{BODY}, \text{> </A}) = \{ (\text{BODY}, \$) \}$
- 

#### P. Img

- $\delta(\text{BODY}, \text{ <img}) = \{ (\text{BODY}, \$) \}$

#### Q. Button

- $\delta(\text{BODY}, \text{<button </body}) = \{ (\text{BODY}, \text{OATb</body}) \}$
- $\delta(\text{BODY}, \text{id=" OATb}) = \{ (\text{BODY}, \text{"OATb}) \}$
- $\delta(\text{BODY}, \text{class=" OATb}) = \{ (\text{BODY}, \text{"OATb}) \}$
- $\delta(\text{BODY}, \text{style=" OATb}) = \{ (\text{BODY}, \text{"OATb}) \}$
- $\delta(\text{BODY}, \text{type=" OATb}) = \{ (\text{BODY}, \text{"OATb}) \}$
- $\delta(\text{BODY}, \text{submit TYPEB}) = \{ (\text{BODY}, \$) \}$
- $\delta(\text{BODY}, \text{reset TYPEB}) = \{ (\text{BODY}, \$) \}$
- $\delta(\text{BODY}, \text{button TYPEB}) = \{ (\text{BODY}, \$) \}$
- $\delta(\text{BODY}, \text{> OATb}) = \{ (\text{BODY}, \text{<button}) \}$
- $\delta(\text{BODY}, \text{</button <button}) = \{ (\text{BODY}, \text{</button}) \}$
- $\delta(\text{BODY}, \text{> </button}) = \{ (\text{BODY}, \$) \}$

#### R. Form

- $\delta(\text{BODY}, \text{<form </body}) = \{ (\text{BODY}, \text{OATf<body}) \}$
- $\delta(\text{BODY}, \text{id=" OATf}) = \{ (\text{BODY}, \text{"OATf}) \}$
- $\delta(\text{BODY}, \text{class=" OATf}) = \{ (\text{BODY}, \text{"OATf}) \}$
- $\delta(\text{BODY}, \text{style=" OATf}) = \{ (\text{BODY}, \text{"OATf}) \}$
- $\delta(\text{BODY}, \text{action=" OATf}) = \{ (\text{BODY}, \text{"OATf}) \}$
- $\delta(\text{BODY}, \text{method=" OATf}) = \{ (\text{BODY}, \text{METHODf"OATf}) \}$
- $\delta(\text{BODY}, \text{GET METHODf}) = \{ (\text{BODY}, \$) \}$
- $\delta(\text{BODY}, \text{get METHODf}) = \{ (\text{BODY}, \$) \}$
- $\delta(\text{BODY}, \text{POST METHODf}) = \{ (\text{BODY}, \$) \}$

- $\delta(\text{BODY}, \text{post METHODf}) = \{ (\text{BODY}, \$) \}$
  - $\delta(\text{BODY}, > \text{OATf}) = \{ (\text{BODY}, <\text{form}) \}$
  - $\delta(\text{BODY}, <\text{input } <\text{form}) = \{ (\text{BODY}, <\text{input}<\text{form}) \}$
  - $\delta(\text{BODY}, <\text{button } <\text{form}) = \{ (\text{BODY}, \text{OATb}<\text{form}) \}$
  - $\delta(\text{BODY}, </\text{form } </\text{form}) = \{ (\text{BODY}, </\text{form}) \}$
  - $\delta(\text{BODY}, > </\text{form}) = \{ (\text{BODY}, \$) \}$
5. `/BODY`
- $\delta(\text{BODY}, </\text{body}, </\text{body}) = \{ (/ \text{BODY}, \$) \}$
  - $\delta(/ \text{BODY}, >, >) = \{ (/ \text{HTML}, \$) \}$
6. `/HTML`
- $\delta(/ \text{HTML}, </\text{html}, </\text{html}) = \{ (/ \text{HTML}, \$) \}$
  - $\delta(/ \text{HTML}, >, >) = \{ (\text{FINAL}, \$) \}$

### III. IMPLEMENTASI DAN PENGUJIAN

Terdapat beberapa program yang digunakan pada Tugas Besar ini. Pertama adalah program berbahasa Python yang bernama HTML.py yang membaca file HTML yang diinput. HTML.py memiliki fungsi untuk membaca file HTML. HTML.py memiliki spesifikasi sebagai berikut.

#### A. Struktur Data

##### 1. Atribut kelas

- `file_name`

String yang menyimpan nama file HTML yang dimasukkan oleh pengguna.

- `content`

List yang digunakan untuk menyimpan isi-isi dari file HTML yang dibaca setelah pemrosesan.

#### B. Fungsi

##### 1. `__init__(self)`

Fungsi ini memiliki fungsi untuk inisialisasi objek HTML dan menginisialisasi “content” sebagai list kosong.

##### 2. `read_and_process_file(self)`

Fungsi ini membaca dan memproses file HTML, mengidentifikasi tag dan teks, serta menyimpan hasilnya dalam list kosong yaitu “content”.

##### 3. `get_content(self)`

Fungsi ini mengembalikan isi dari file HTML yang dibaca setelah pemrosesan di fungsi sebelumnya.

#### C. Antarmuka

1. Input Pengguna

Input pengguna berupa masukan nama file HTML ketika pembuatan dari objek HTML.

2. Output

Output dari program HTML.py berupa pencetakan dari isi-isi di file HTML menggunakan `print(html_reader.get_content())`.

3. Interaksi dengan Library Eksternal

Untuk interaksi dengan library eksternal menggunakan modul bawaan Python untuk membaca dan memproses file.

4. Antarmuka dengan Pengguna

Antarmuka dengan pengguna terjadi melalui console saat pengguna diminta untuk memasukkan nama file HTML.

Kemudian adalah program berbahasa Python dengan nama yaitu PDA.py yang berfungsi untuk membaca PDA serta memanipulasi PDA. Program ini bekerja bersamaan dengan HTML.py untuk mengecek kebenaran dari sintaks yang digunakan di file HTML yang dibaca. Untuk spesifikasi dari PDA.py adalah sebagai berikut.

#### A. Struktur Data

1. Atribut kelas

- `states`

Suatu set yang menyimpan himpunan dari semua state PDA yang digunakan oleh program.

- `input_symbols`

Suatu set yang menyimpan himpunan dari semua simbol PDA yang digunakan oleh program.

- `stack_symbols`

Suatu set yang menyimpan himpunan dari semua simbol stack PDA yang digunakan oleh program.

- `start_state`

Suatu set yang menyimpan state awal PDA yang digunakan oleh program.

- `start_stack`

Suatu set yang menyimpan simbol stack awal PDA yang digunakan oleh program.

- `accept_states`

Suatu set yang menyimpan himpunan dari state akhir PDA yang digunakan oleh program.

- `transitions`



Kamus yang menyimpan fungsi transisi PDA dalam bentuk tuple (next\_state, stack\_operation) dengan kunci (current\_state, input\_symbol, stack\_symbol).

## B. Fungsi

### 1. `__init__(self)`

Fungsi ini memiliki fungsi untuk inialisasi objek PDA agar dapat digunakan.

### 2. `add_transition(self, current_state, input_symbol, stack_symbol, next_state, stack_operation)`

Fungsi ini menambah transisi pada PDA yang sudah diinisialisasi oleh fungsi sebelumnya.

### 3. `read_pda(self, filename)`

Fungsi ini membaca spesifikasi dari PDA yang digunakan serta menginisialisasi atribut-atribut PDA tersebut.

### 4. `simulate(self, input)`

Fungsi ini mensimulasikan PDA yang digunakan terhadap input-input tertentu.

## C. Antarmuka

### 1. Input Pengguna

Input pengguna digunakan dalam `read_pda(self, filename)` untuk membaca spesifikasi dari PDA yang digunakan di text file.

### 2. Output

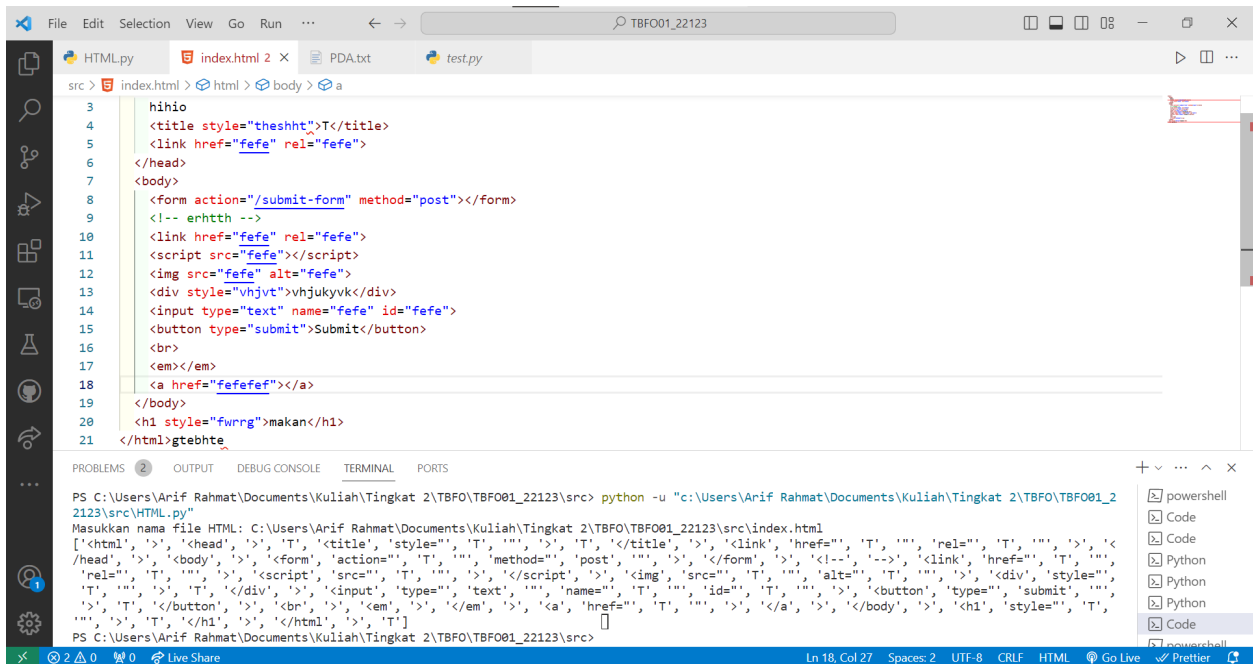
Output dari program PDA.py berupa pencetakan dari hasil simulasi dengan PDA yang digunakan.

### 3. Antarmuka dengan Pengguna

Program melakukan interaksi dengan pengguna dengan membuat objek PDA, membaca spesifikasi PDA dari file, dan menggunakan `simulate(self, input)`.

Program yang dibuat sudah melalui pengujian untuk memastikan program berjalan dengan baik. Dibawah ini adalah pengujian yang dilakukan.

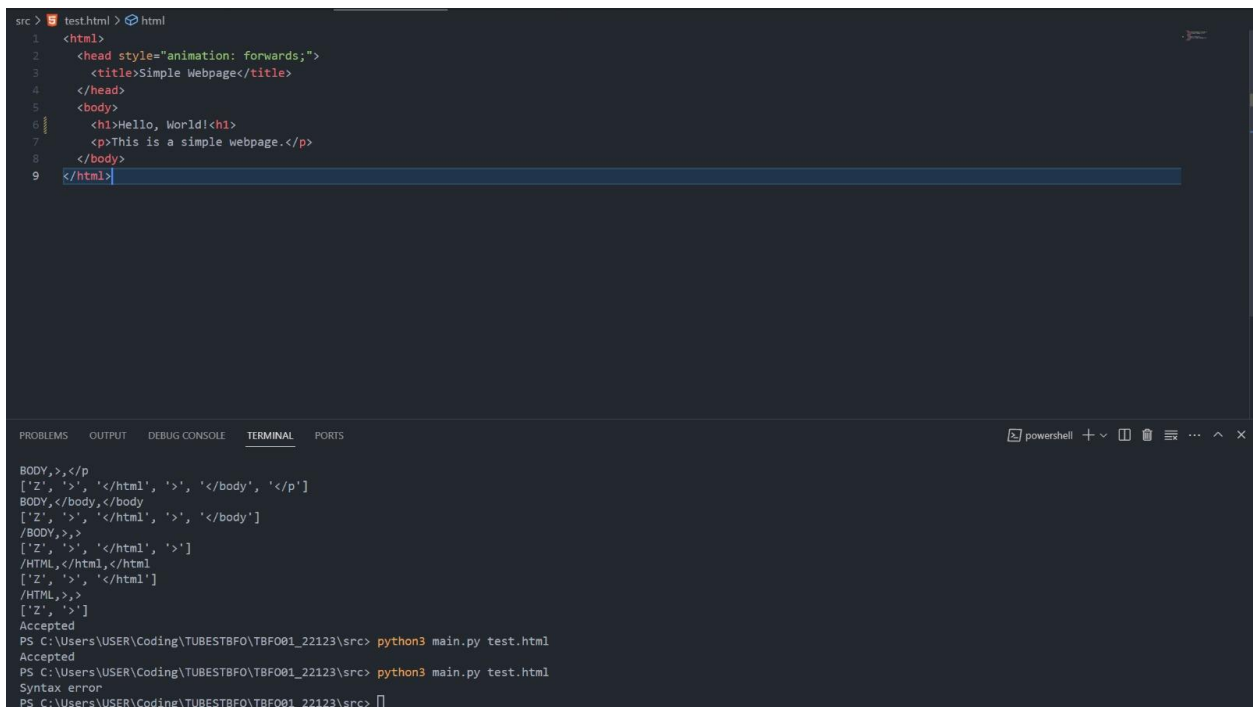
## Pengujian Parsing



```
3 hihio
4 <title style="theshtt">T</title>
5 <link href="fefe" rel="fefe">
6 </head>
7 <body>
8 <form action="/submit-form" method="post"></form>
9 <!-- erhtth -->
10 <link href="fefe" rel="fefe">
11 <script src="fefe"></script>
12 
13 <div style="vhjvt">vhjukyvk</div>
14 <input type="text" name="fefe" id="fefe">
15 <button type="submit">Submit</button>
16 <br>
17 <em></em>
18 <a href="fefefef"></a>
19 </body>
20 <h1 style="fwrrg">makan</h1>
21 </html>gtebhte
```

```
PS C:\Users\Arif Rahmat\Documents\Kuliah\Tingkat 2\TBFO\TBFO01_22123\src> python -u "c:\Users\Arif Rahmat\Documents\Kuliah\Tingkat 2\TBFO\TBFO01_22123\src\HTML.py"
Masukkan nama file HTML: C:\Users\Arif Rahmat\Documents\Kuliah\Tingkat 2\TBFO\TBFO01_22123\src\index.html
['<html', '>', '<head', '>', 'T', '<title', 'style=', 'T', '', '>', 'T', '</title>', '>', '<link', 'href=', 'T', '', 'rel=', 'T', '', '>', '</head>', '>', '<body>', '>', '<form', 'action=', 'T', '', 'method=', 'post', '', '>', '</form>', '>', '<!--', '-->', '<link', 'href=', 'T', '', 'rel=', 'T', '', '>', '<script', 'src=', 'T', '', '>', '</script>', '>', '<img', 'src=', 'T', '', 'alt=', 'T', '', '>', '<div', 'style=', 'T', '', '>', '</div>', '>', '<input', 'type=', 'text', '', 'name=', 'T', '', 'id=', 'T', '', '>', '<button', 'type=', 'submit', '', '>', '</button>', '>', '<br>', '>', '<em>', '>', '</em>', '>', '<a', 'href=', 'T', '', '>', '</a>', '>', '</body>', '>', '<h1', 'style=', 'T', '', '>', '</h1>', '>', '</html>', '>', 'T']
```

## Testing HTML



```
1 <html>
2 <head style="animation: forwards;">
3 <title>Simple Webpage</title>
4 </head>
5 <body>
6 <h1>Hello, World!</h1>
7 <p>This is a simple webpage.</p>
8 </body>
9 </html>
```

```
BODY,>,</p>
['Z', '>', '</html>', '>', '</body>', '</p>']
BODY,</body>,</body>
['Z', '>', '</html>', '>', '</body>']
/BODY,>,>
['Z', '>', '</html>', '>']
/HTML,</html>,</html>
['Z', '>', '</html>']
/HTML,>,>
['Z', '>']
Accepted
PS C:\Users\USER\Coding\TUBESTBFO\TBFO01_22123\src> python3 main.py test.html
Accepted
PS C:\Users\USER\Coding\TUBESTBFO\TBFO01_22123\src> python3 main.py test.html
Syntax error
PS C:\Users\USER\Coding\TUBESTBFO\TBFO01_22123\src>
```

```
src > test.html > html
1  <html>
2    <head style="animation: forwards;">
3      <title>Simple Webpage</title>
4    </head>
5    <body>
6      <h1>Hello, World!</h1>
7      <p>This is a simple webpage.</p>
8    </body>
9  </html>
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

BODY,>,</p  
['Z','>', '</html', '>', '</body', '</p']  
BODY,</body,</body  
['Z','>', '</html', '>', '</body']  
/BODY,>,  
['Z','>', '</html', '>']  
/HTML,</html,</html  
['Z','>', '</html']  
/HTML,>,  
['Z','>']  
Accepted  
PS C:\Users\USER\Coding\TUBESTBFO\TBFO01\_22123\src> python3 main.py test.html  
Accepted  
PS C:\Users\USER\Coding\TUBESTBFO\TBFO01\_22123\src> python3 main.py test.html  
Syntax error  
PS C:\Users\USER\Coding\TUBESTBFO\TBFO01\_22123\src> []

#### IV. PEMBAGIAN TUGAS DAN LINK PENTING

Jimly Nur Arif	Pembuatan kode Python, test
Hafizh Hananta Akbari	Pembuatan laporan
Rayhan Ridhar Rahman	Pembuatan PDA

Link repository GitHub: [https://github.com/Rinnearu/TBFO01\\_22123](https://github.com/Rinnearu/TBFO01_22123)

Link diagram state:

[https://docs.google.com/document/d/1h7R-vdVzK9o\\_rbFE9QqIIWhHzmViHNhJXez5eDuMy2g/](https://docs.google.com/document/d/1h7R-vdVzK9o_rbFE9QqIIWhHzmViHNhJXez5eDuMy2g/)