ITCS 6150/8150 – Fall 2020 – RS method project

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The application can be used to determine whether the given formula in the propositional calculus is a tautology or not using RS method.

<u>Steps to execute the application:</u>

- After we unzip the project, first we need to setup the environment by executing the following steps:

1. For installing Virtual Environment run:

   pip install virtualenv

2. Now, test your installation

   virtualenv --version

3. Switch to Virtual Environment:

   virtualenv venv

4. Activate the virtual environment:

   On macOS and Linux:

   source venv/bin/activate

   On Windows:

   .\venv\Scripts\activate

5. Now, install all the necessary packages mentioned in the dependency.txt file:

   pip install -r dependency.txt

6. Confirm all the packages have been installed:

   pip freeze

7. Once all the above steps are done, now we need to run the application

   python server.py

The application would start running on localhost and would provide you with the URL. Now open browser and hit the URL to access the application.

Running on http://127.0.0.1:5000/

```
(venv) D:\Courses\Sem3\IS\Project\ashwin>python server.py
 * Serving Flask app "server" (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: on
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 333-188-045
 * Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
```

- After you open the URL in the browser, you will see the following screen.

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Symbols used:

A = A

~A = not(A)

A ^ B = and(A,B)

A v B = or(A,B)

A->B = if(A,B)

A<->B = iff(A, B)

```
Enter the Formula
```
```
Submit
```

- To execute the formulas, we need to convert it using the symbols mentioned on the screen.

  A = A

  ~A = not(A)

  A ^ B = and(A,B)

  A v B = or(A,B)

  A->B = if(A,B)

  A<->B = iff(A, B)

For example, we have converted the sample inputs given by the professor.

(1) ~(a -> c) -> [~(c v d)-> (a ^ ~c)]

To execute the above formula we need to enter the below converted formula using symbols into the application.

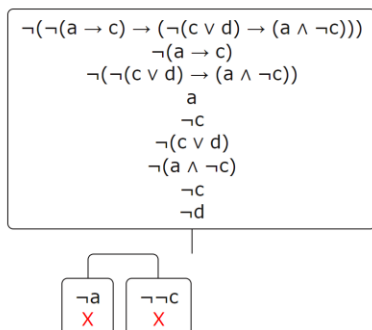**if((not(if(a, c))),if(not(or(c,d)),and(a,not(c))))**

Output of the above formula:

if((not(if(a, c))),if(not(or(c,d)),and(a,not(c))))

Submit

Yes, it is a Tautology!

$$\neg(\neg(a \rightarrow c) \rightarrow (\neg(c \vee d) \rightarrow (a \wedge \neg c)))$$
$$\neg(a \rightarrow c)$$
$$\neg(\neg(c \vee d) \rightarrow (a \wedge \neg c))$$
$$a$$
$$\neg c$$
$$\neg(c \vee d)$$
$$\neg(a \wedge \neg c)$$
$$\neg c$$
$$\neg d$$

$$\neg a \qquad \neg\neg c$$
$$X \qquad\quad X$$

(2) ~(a -> c) -> [~(c v d)-> (a ^ c)]

if(not(if(a, c)),if(not(or(c, d)),and(a, c)))

Output of the above formula:

if(not(if(a, c)),if(not(or(c, d)),and(a, c)))

Submit

No, it is not a Tautology!

¬(¬(a → c) → (¬(c ∨ d) → (a ∧ c)))
¬(a → c)
¬(¬(c ∨ d) → (a ∧ c))
a
¬c
¬(c ∨ d)
¬(a ∧ c)
¬c
¬d

¬a   ¬c
X