

# CS678 Advanced Natural Language Processing Project

## Testing with various Claims.

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### 1.Claim:Donald Trump and Joe Biden were born in the same state.

**Input Claim:**  
Donald Trump and Joe Biden were born in the same state.

**Question Answering Decomposition:**

Reasoning depth: 0

Generated Question: In which state were Donald Trump and Joe Biden born?

Predicted Answer: Donald Trump was born in New York and Joe Biden was born in Pennsylvania.

search

Donald Trump was born in New York and Joe Biden was born in Pennsylvania.  
Source: [https://en.wikipedia.org/wiki/Donald\\_Trump](https://en.wikipedia.org/wiki/Donald_Trump)  
Source: [https://en.wikipedia.org/wiki/Joe\\_Biden](https://en.wikipedia.org/wiki/Joe_Biden)

Reasoning depth: 1

Generated Question: Were Donald Trump and Joe Biden born in the same state?

Predicted Answer: No, Donald Trump and Joe Biden were not born in the same state.

search

No, Donald Trump and Joe Biden were not born in the same state. Donald Trump was born in Queens, New York, while Joe Biden was born in Scranton, Pennsylvania.  
Source:

**Prediction with rationale:**  
Donald Trump was born in New York and Joe Biden was born in Pennsylvania. Donald Trump and Joe Biden were not born in the same state. Therefore, the final answer is: False.

### Our analysis on how the claim is getting processed:

This architecture describes a method for repeatedly creating queries, getting responses, and determining whether the evidence is sufficient to support a claim. Let's examine the procedure for the specified assertion "Donald Trump and Joe Biden were born in the same state":

### Claim Verifier $\mathcal{V}$ :

Assesses whether the current context is adequate to support the claim. In this instance, it evaluates whether the current situation lends credence to the assertion that Joe Biden and Donald Trump have a same birth state.

**Question Generator  $\mathcal{Q}$ :**

Produces the subsequent query depending on the available information that is required to validate the assertion. "In which state were Donald Trump and Joe Biden born?" is the inquiry that the question generator creates in order to elicit more precise information pertinent to the assertion.

**Question-Answering Model  $\mathcal{A}$ :**

Responds to the query posed by  $\mathcal{Q}$  and offers the proof in support of the answer. Along with the supporting data, the model predicts the response, "Joseph Biden was born in Pennsylvania, and Donald Trump was born in New York."

**Validator  $\mathcal{V}$ :**

Verifies, in light of the claim and the current context, the newly created (question, answer) pair's utility. The validator evaluates whether or not  $\mathcal{A}$ 's response is consistent with the assertion and the current situation. If the response refutes the assertion, it might lead to more inquiries or explanations.

**Reasoner  $\mathcal{R}$ :**

Makes use of pertinent context to support the claim's validity. To arrive at a final assessment of the claim's veracity, the reasoner compiles data from the claim, questions, answers, and validation outcomes. In this instance, it comes to the conclusion that the assertion that Joe Biden and Donald Trump were born in the same state is untrue because they were born in different states.

All things considered, this architecture makes it easier to conduct a methodical approach to fact-checking by allowing users to repeatedly gather evidence, evaluate its adequacy, and make decisions about the claim's truthfulness based on the facts at hand. Each component's examination adds to a more thorough comprehension of the veracity of the claim.

**Claim 2.** Not only default claims but also we could turn in our own claims and here are few claims of they are getting answered:

Input Claim:

Did India win the first cricket world cup in the year 1983?

Question Answering Decomposition:

Reasoning depth: 0

Generated Question: Who won the first cricket world cup in the year 1983?

Predicted Answer: India

search

India won the first cricket world cup in the year 1983. Here is a relevant Wikipedia article:  
https://en.wikipedia.org/wiki/1983\_Cricket\_World\_Cup

Prediction with rationale:

India won the first cricket world cup in the year 1983. Therefore, the final answer is: True.

### Claim Verifier $\mathcal{D}$ :

Assesses whether the current context is adequate to support the claim.

### Question Generator $\mathcal{Q}$ :

Produces the subsequent query depending on the available information that is required to validate the assertion. To obtain more precise information pertinent to the claim, the question generator in this instance creates the query, "Who won the first cricket world cup in the year 1983?"

### Question-Answering Model $\mathcal{A}$ :

Responds to the query posed by  $\mathcal{Q}$  and offers the proof in support of the answer. The response that the program predicts is "India," indicating that the country won the inaugural cricket world cup in 1983.

### Validator $\mathcal{V}$ :

Verifies, in light of the claim and the current context, the newly created (question, answer) pair's utility. The validator evaluates whether or not  $\mathcal{V}$ 's response is consistent with the assertion and the current situation.

### Reasoner $\mathcal{R}$ :

Makes use of pertinent context to support the claim's validity. To arrive at a final assessment of the claim's veracity, the reasoner compiles data from the claim, questions, answers, and validation outcomes. In this instance, it deduces that the assertion that India won the inaugural cricket world cup in 1983 is accurate because the response "India" supports the claim.

And when there is just question like:

**Claim3:**"When did India win the first cricket world cup?"

Then model is being little in ambiguous state as it is drawing up wrong context in few question decompositions as following image:

Input Claim:

When did India win the first cricket world cup?

Question Answering Decomposition:

Reasoning depth: 0

Generated Question: Who won the first cricket world cup?

Predicted Answer: West Indies

Reasoning depth: 1

Generated Question: When did India win their first cricket world cup?

Predicted Answer: India won their first cricket world cup on June 25, 1983.

Reasoning depth: 2

Generated Question: When did West Indies win the first cricket world cup?

Predicted Answer: West Indies won the first cricket world cup in 1975.

search

The first Cricket World Cup was won by the West Indies in 1975. You can find more information about this event on the Wikipedia page for the 1975 Cricket World Cup:  
[https://en.wikipedia.org/wiki/1975\\_Cricket\\_World\\_Cup](https://en.wikipedia.org/wiki/1975_Cricket_World_Cup)

search

India won their first cricket world cup on June 25, 1983. You can find more information about this victory on the Wikipedia page titled "1983 Cricket World Cup."

search

West Indies won the first cricket world cup in 1975. Here is a relevant Wikipedia article:  
[https://en.wikipedia.org/wiki/1975\\_Cricket\\_World\\_Cup](https://en.wikipedia.org/wiki/1975_Cricket_World_Cup)

Prediction with rationale:

West Indies won the first cricket world cup. India won their first cricket world cup on June 25, 1983. West Indies won the first cricket world cup in 1975. Therefore, the final answer is: False.

So when we give claim as “When did India win the first cricket world cup?” the model is turning out to give the results related to West indies too because in context there is even the phrase first world cup which is acquired by country West Indies. This shows when the claim is being ambiguous and asking just raw question might lead the model to assume some conditions and answer as seen drafting its Reasoning Depths.

3. We even tried to give the customs Claim in different languages like Telugu, Hindi and Chinese and these are outputs results it turn out to give:

Input Claim:

మనిషికి సరిగ్గా 86 బిలియన్ న్యూరాన్లు ఉన్నాయి.

Question Answering Decomposition:

Reasoning depth: 0

search

Generated Question: How many neurons does a human have?

The human brain contains around 86 billion neurons. For more information, you can refer to the Wikipedia article on "Neuron" which discusses the structure and function of neurons in detail.

Predicted Answer: The human brain contains around 86 billion neurons.

Prediction with rationale:

A human has approximately 86 billion neurons in their brain. Therefore, the final answer is: True.

Finish

When there is Claim in Hindi the Answering decomposition is also processed in Hindi language there is no translation at this moment.The output is given under this:

Input Claim:

पहला iPhone 29 जून, 2007 को Apple Inc. द्वारा जारी किया गया था, जिसने स्मार्टफोन उद्योग को क्रांति ला दी।

Question Answering Decomposition:

Reasoning depth: 0

search

Generated Question: किसने पहला iPhone जारी किया था?

The first iPhone was released by Apple Inc. on June 29, 2007. The device was announced by then-CEO Steve Jobs on January 9, 2007, and it marked a significant milestone in the history of smartphones. The iPhone combined a mobile phone, an iPod, and an internet communication device into

Predicted Answer: एप्पल इंक ने 29 जून, 2007 को पहला iPhone

Prediction with rationale:

एप्पल इंक ने 29 जून, 2007 को पहला iPhone जारी किया था। Therefore, the final answer is: True.

Input Claim:

第一个计算机病毒被称为“爬行者”，于1971年创建，针对运行TENEX操作系统的大型计算机。

Question Answering Decomposition:

Reasoning depth: 0

search

Generated Question: 什么是第一个计算机病毒的名称?

The first computer virus is known as the "Creeper virus." It was created in the early 1970s by Bob Thomas at BBN Technologies. The virus was designed to infect DEC PDP-10 computers running the TENEX operating system. The Creeper virus would display the message "I'm the creeper"

Predicted Answer: Creeper virus.

Prediction with rationale:

The first computer virus was named Creeper virus. Therefore, the final answer is: True.

These are the outputs and testing we made to observe how the used model is giving the answers and how there is answers decompositions is taking place.How the model is behaving when it is given a normal question which is not a fact and how it tries to solve that.We also tried to give the

claim in different languages in tried to see if the model is able to be Multilingual and produce same and accurate results as in english and thats working well.