**In** [**Together.ai**](http://together.ai) **- LLAMA 70B**

**Without Shapes or M-schema**

**Here is the prompt I gave:**

Task: Convert a natural language question into a SPARQL query based on the given RDF data (TTL file).

RDF Context (Turtle format):

@prefix ex: <http://example.org/> .

@prefix owl: <http://www.w3.org/2002/07/owl#> .

@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .

@prefix xml: <http://www.w3.org/XML/1998/namespace> .

@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .

@prefix obda: <https://w3id.org/obda/vocabulary#> .

@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .

### http://example.org/eventat

ex:eventat rdf:type owl:ObjectProperty ;

rdfs:domain ex:Location ;

rdfs:range ex:Event ;

rdfs:label "Event At" .

### http://example.org/eventon

ex:eventon rdf:type owl:ObjectProperty ;

rdfs:domain ex:Calendar ;

rdfs:range ex:Event ;

rdfs:label "Event On" .

### http://example.org/eventcatclassid

ex:eventcatclassid rdf:type owl:DatatypeProperty ;

rdfs:domain ex:EventCategory ;

rdfs:range xsd:string ;

rdfs:label "Eventcat Classid" .

### http://example.org/eventcatname\_it

ex:eventcatname\_it rdf:type owl:DatatypeProperty ;

rdfs:domain ex:EventCategory ;

rdfs:range xsd:string ;

rdfs:label "Eventcat Name" .

### http://example.org/eventclassid

ex:eventclassid rdf:type owl:DatatypeProperty ;

rdfs:domain ex:Event ;

rdfs:range xsd:string ;

rdfs:label "Event Class ID" .

### http://example.org/eventdescr\_it

ex:eventdescr\_it rdf:type owl:DatatypeProperty ;

rdfs:domain ex:Event ;

rdfs:range xsd:string ;

rdfs:label "Event Description (IT)" .

### http://example.org/eventimage\_url

ex:eventimage\_url rdf:type owl:DatatypeProperty ;

rdfs:domain ex:Event ;

rdfs:range xsd:string ;

rdfs:label "Event Image URL" .

### http://example.org/eventname\_it

ex:eventname\_it rdf:type owl:DatatypeProperty ;

rdfs:domain ex:Event ;

rdfs:range xsd:string ;

rdfs:label "Event Name" .

### http://example.org/Event

ex:Event rdf:type owl:Class ;

rdfs:label "Event" .

### http://example.org/calendarclassid

ex:calendarclassid rdf:type owl:DatatypeProperty ;

rdfs:domain ex:Calendar ;

rdfs:range xsd:string ;

rdfs:label "Calendar Class ID" .

### http://example.org/day

ex:day rdf:type owl:DatatypeProperty ;

rdfs:domain ex:Calendar ;

rdfs:range xsd:date ;

rdfs:label "day" .

### http://example.org/end\_time

ex:end\_time rdf:type owl:DatatypeProperty ;

rdfs:domain ex:Calendar ;

rdfs:range xsd:string ;

rdfs:label "EndTime" .

### http://example.org/start\_time

ex:start\_time rdf:type owl:DatatypeProperty ;

rdfs:domain ex:Calendar ;

rdfs:range xsd:string ;

rdfs:label "StartTime" .

### http://example.org/Calendar

ex:Calendar rdf:type owl:Class ;

rdfs:label "Calendar" .

### http://example.org/Location

ex:Location rdf:type owl:Class ;

rdfs:label "Location" .

### http://example.org/locationclassid

ex:locationclassid rdf:type owl:DatatypeProperty ;

rdfs:domain ex:Location ;

rdfs:range xsd:string ;

rdfs:label "Location Class ID" .

### http://example.org/address

ex:address rdf:type owl:DatatypeProperty ;

rdfs:domain ex:Location ;

rdfs:range xsd:string ;

rdfs:label "Address" .

User Question:

**"What events happen on 2015-12-12 with details?"**

**Here is the prompt I gave next time:**

*I gave* ***only\_events.ttl***  *as a prompt and:*

*Task: Convert a natural language question into a SPARQL query based on the given RDF data (TTL file).*

*RDF Context (Turtle format) I gave above.* ***Please consider that all the data inside the database that to which map this TTL inside tables are in Italian.***  *User Question:*

***"What are the events for kids? Can you give me the details about those events, day, time and location?"***

**The user questions tried:**

1. What are the events belong to the event categories related to kids? Can you give me the details about those events, day, time and location?
2. can you give me the descriptions of the operatic shows in Arena?
3. Can you give me the details related to events that belong to parties category please?
4. I want to see an anniversary celebration on 2016-02-14. Can you give me the details related to the events that I can enjoy an anniversary celebration?

**Next Try SHAPES - events\_only\_with\_shapes.ttl**

can you give me events that does not have a location?

Now please consider that to the given TTL file earlier, I add this shape also ### http://example.org/EventShape

ex:EventShape rdf:type owl:NamedIndividual ,

sh:NodeShape ;

sh:property [ sh:datatype xsd:string ;

sh:maxCount 1 ;

sh:minCount 1 ;

sh:path ex:eventclassid

] ,

[ sh:datatype xsd:string ;

sh:minCount 1 ;

sh:path ex:eventname\_it

] ,

[

sh:path ex:eventat ;

sh:minCount 1 ; # Ensures every event has at least one location

sh:class ex:Location ;

] ;

sh:targetClass ex:Event . Can you give me event details that does not have a location?

Note: here I did not add the whole events\_only\_with\_shapes.ttl file. Instead instructed the prompt to consider the given shape as a part of the earlier ttl file.

Next, to test how the model does query corrections and uses Shapes, the LLM is provided with the user question:

I want to know the list of events so I try this query:" SELECT ?event ?name WHERE { ?event a ex:Event . OPTIONAL { ?event ex:eventname\_it ?name . } }

**M-schema**

Task: I have the following M-schema based on a RDF data(TTL file). Convert a natural language question into a SPARQL query based on the given M-schema.

Please consider that all the data inside the database that to which map this TTL inside tables are in Italian.

[Ontology] events 【Schema】

@prefix ex: <http://example.org/> .

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# Classes

[Classes]

ex:Event 【Class】 → Represents an event

ex:Calendar 【Class】 → Represents a calendar entry

ex:Location 【Class】 → Represents a location

ex:State 【Class】 → Represents the state of an event

ex:EventCategory 【Class】 → Represents a category of an event

# Object Properties

[Relationships]

ex:eventat 【ObjectProperty】 (ex:Location → ex:Event)

- "Event is connected to Location entity. Each event must have a location"

- Example:

ex:location ex:eventat ex:event .

ex:eventon 【ObjectProperty】 (ex:Event → ex:Calendar)

- "Event is connected to Calendar entity."

- Example:

ex:calendar ex:eventon ex:event .

ex:eventstate 【ObjectProperty】 (ex:Event → ex:State)

- "An event has a status/state."

ex:belongsToCategory 【ObjectProperty】 (ex:Event → ex:EventCategory)

- "An event belongs to a category."

- Example:

ex:event ex:belongsToCategory ex:eventcategory .

# Datatype Properties

[Attributes]

ex:eventclassid 【DatatypeProperty】 (ex:Event → xsd:string)

- "Unique identifier for an event."

ex:eventname\_it 【DatatypeProperty】 (ex:Event → xsd:string)

- "Event name in Italian. Each event must have a name"

ex:eventdescr\_it 【DatatypeProperty】 (ex:Event → xsd:string)

- "Event description in Italian."

ex:eventimage\_url 【DatatypeProperty】 (ex:Event → xsd:string)

- "URL of the event image."

ex:calendarclassid 【DatatypeProperty】 (ex:Calendar → xsd:string)

- "Unique identifier for a calendar entry."

ex:day 【DatatypeProperty】 (ex:Calendar → xsd:date)

- "Date of the event."

ex:start\_time 【DatatypeProperty】 (ex:Calendar → xsd:string)

- "Event start time."

ex:end\_time 【DatatypeProperty】 (ex:Calendar → xsd:string)

- "Event end time."

ex:locationclassid 【DatatypeProperty】 (ex:Location → xsd:string)

- "Unique identifier for a location."

ex:address 【DatatypeProperty】 (ex:Location → xsd:string)

- "Address of the location."

ex:statecode 【DatatypeProperty】 (ex:State → xsd:string)

- "Code representing the state of an event."

ex:statename 【DatatypeProperty】 (ex:State → xsd:string)

- "Name of the event state."

- Example: ["eliminato", "attivo"]

ex:eventcatclassid 【DatatypeProperty】 (ex:EventCategory → xsd:string)

- "Unique identifier for an event category."

ex:eventcatname\_it 【DatatypeProperty】 (ex:EventCategory → xsd:string)

- "Category name in Italian."

- Example: ["Anniversari e Commemorazioni","Arte e Cultura","Conferenze","Incontri Convegni Congressi","Mostre","Rassegna","Solidarietà", "Visite guidate","Attività per bambini","Campi estivi ragazzi","Concerti","Feste","Festival","Fiere Mercati e Sagre","Manifestazioni sportive", "Spettacoli","Spettacoli extra lirica in Arena","Turismo","Altro"]

*User Question:*

*"What are the events for kids? Can you give me the details about those events, day, time and location?" —>same question asked with TTL and tried mentioned questions.*

When considering the use of Shapes, in M-schema, the constraints are included as natural language descriptions; the model still managed to optimize the query—provided that instructions explicitly asked the LLM to read descriptions carefully, the answer given by model to the user question:

Can you give me only the event names of the events that have a location?