

# FIRE (**F**inancial **R**elation **E**xtraction) Dataset Annotation Guidelines

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This is the annotation guidelines for the FIRE (Financial Relation Extraction) dataset. The dataset can be found at <https://github.com/hmhamad/FIRE>. The main objective of this document is to provide a comprehensive manual that outlines the standards and practices for annotating entities and relations in the FIRE dataset. As such, this document is pivotal to understanding and maintaining the consistency and quality of annotations in the dataset.

The document is divided into six key sections. In Section 1, we provide a summary list of all entity types and relation types included in the FIRE dataset. Section 2 and 3 offer definitions and basic examples of the entities and relations that can be found in the dataset, respectively. In Section 4 and 5, we delve into more intricate use cases, covering edge cases and guidelines for conflict resolution when labeling entities and relations, respectively. Lastly, in Section 6, we present a set of general entity and term annotation guidelines, some of which are based on the ACL RD-TEC guidelines <sup>1</sup>.

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<sup>1</sup><https://aclanthology.org/L16-1294/>

# 1 Summary List of Named Entities and Relations

13 Entity Types & 15 Relation Types

Entity Type	Relation Type
Action	ActionBuy
BusinessUnit	Actionin
Company	ActionSell
Date	Designation
Designation	Employeeof
FinancialEntity	Locatedin
GeopoliticalEntity	Productof
Location	Propertyof
Money	Quantity
Person	Sector
Product	Subsidiaryof
Quantity	Value
Sector	ValueChangeDecreaseby
	ValueChangeIncreaseby
	Valuein

## 2 Definition of Named Entities

### Entity 1: Action (AC)

- ★ *Definition:* Refers to any activity or event that signifies a transaction or occurrence in the financial market, such as company acquisitions, share purchases, mergers, initial public offerings (IPOs), and other similar events.
- ★ *Example entities:* {acquire; sell; buy; co-founded; acquisition; IPO; merger; spin off; separated; launch; released; invest; takeover}
- ★ *Example Sentence Mention:* “Apple is reported to **acquire** AI startup Voxun for \$10 million.”

### Entity 2: BusinessUnit (BU)

- ★ *Definition:* Represents a distinct unit or department within a company, excluding subsidiaries, and can include facilities, stores, or company assets, as well as employees associated with that unit or department.
- ★ *Example entities:* {semiconductor division, Staples center, marketing department, Supermarket, manufacturing plants, etc.}
- ★ *Example Sentence Mention:* “The **Data&AI team** in Microsoft’s **Cloud and AI division** is a group of passionate scientists and engineer”

### Entity 3: Company (CO)

- ★ *Definition:* Denotes the official or unofficial name of a registered company or a brand.
- ★ *Example entities:* {Apple Inc.; Uber; Bank of America}
- ★ *Example Sentence Mention:* “**Walmart**’s headquarters is located in Bentonville, Arizona.”

### Entity 4: Date (DA)

- ★ *Definition:* Represents a specific time period, whether explicitly mentioned (e.g., “year ended March 2020”) or implicitly referred to (e.g., “last month”), in the past, present, or future.
- ★ *Example entities:* {June 2nd, 2010; quarter ended 2021; last week; prior year; Wednesday}
- ★ *Example Sentence Mention:* “Revenue increased by \$3 million and \$2 million in **fiscal years 2016** and **2015**, respectively.”

### Entity 5: Designation (DE)

- ★ *Definition:* Refers to an official position held within a company, such as CEO, a job description, such as analyst, or any role played in a financial transaction, including customers, sellers, buyers, third parties, trustees, and other similar roles. (Note: Employees are categorized as *BusinessUnit*, and companies may have *Designations*, e.g., a company is a Trustee)
- ★ *Example entities:* {CEO; President; Board of Directors; employees; analyst; physician; Professor; customer; seller; stockholder; trustee; third party}
- ★ *Example Sentence Mention:* “Information about our **directors** and **officers** is incorporated by reference from the sections proposal one.”

#### Entity 6: FinancialEntity (FE)

- ★ *Definition:* Represents an entity that possesses a monetary, countable, or quantifiable value within the context of finance, including assets, liabilities, investments, and other similar entities.
- ★ *Example entities:* {Stock; revenue; profit; stake; taxes; loss; grant date fair value; amount outstanding; assets }
- ★ *Example Sentence Mention:* “The growth in **revenue** was primarily the result of increased **sales** of our graphics processor.”

#### Entity 7: GeopoliticalEntity (GE)

- ★ *Definition:* Denotes countries or political regions, even when used as adjectives.
- ★ *Example entities:* {U.S.; Japanese; China; European Union; German}
- ★ *Example Sentence Mention:* “**Finnish** Aldata Solution has signed a contract of supply its G.O.L.D system to retail chains located in **France**.”

#### Entity 8: Location (LO)

- ★ *Definition:* Represents geographical locations that are not political regions/countries, such as regions, states, cities, roads, or any other location.
- ★ *Example entities:* {California; Paris; 1280 W 12th Blvd; Americas; Europe}
- ★ *Example Sentence Mention:* “Elcoteq Dongguan was established in 1999 in **Dongguan**, China and is one of Elcoteq’s four volume manufacturing plants in the **Asia - Pacific region**.”

#### Entity 9: Money (MO)

- ★ *Definition:* Denotes a monetary value expressed in any world currency, including digital currencies.
- ★ *Example entities:* {\$76.3 million; \$4 Bn; Rs 33.80 crore; 1.2 BTC}
- ★ *Example Sentence Mention:* “Revenue increased by **\$3 million** and **\$2 million** in fiscal years 2016 and 2015, respectively.”

#### Entity 10: Person (PE)

- ★ *Definition:* Represents the name of an individual.
- ★ *Example entities:* {Meg Whitman; Mr. Baker; Warren Buffet}
- ★ *Example Sentence Mention:* “**Sharmistha Dubey** is the 51-year-old CEO of the Match Group.”

#### Entity 11: Product (PR)

- ★ *Definition:* Refers to any physical object or service manufactured or provided by a company to consumers, excluding references to businesses or sectors within the financial context (which would be labeled as *Sector*).
- ★ *Example entities:* {iPhone; Tesla model X; cloud services; Microsoft Windows 10; laptops; medical equipment; computer software; online classes; eye surgery}
- ★ *Example Sentence Mention:* “Fitbit Inc. designs **wearable fitness trackers** and **smartwatches**, while also providing personalized **fitness tracking services**.”

### Entity 12: Quantity (QU)

- ★ Definition: Represents any numeric value that is not categorized as *Money*, such as percentages, numbers, measurements (e.g., weight, length), or other similar quantities. Note that unit of measurements are also part of the entity.
- ★ Example entities: {15 %; 25,000 units; 2.75in; 100 tons}
- ★ Example Sentence Mention: “Profit increased by **15%** compared to last quarter, primarily driven by the selling of **5,000** more laptops.”

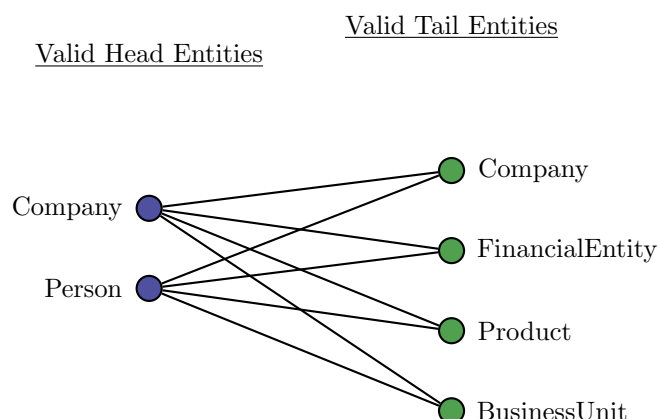
### Entity 13: Sector (SE)

- ★ Definition: Denotes any economic area where businesses compete for products, activities, or services, or any area explicitly stated as a business, segment, or sector. Also, more generic entities such as manufacturer, designer, developer are considered *Sector* entities as well.
- ★ Example entities: {Tech; Healthcare; Automotive; Manufacturer; Retail; Supermarket chains; Software startup; Phone business;}
- ★ Example Sentence Mention: “**Drugmaker** Sanofi SA said on Tuesday it will buy Amunix Pharmaceuticals Inc.”

### 3 Definition of Relations

#### Relation 1: ActionBuy

- ★ Definition: Represents the action of purchasing/acquiring a *Company*, *FinancialEntity*, *Product*, or *BusinessUnit* by a *Company* or a *Person*.

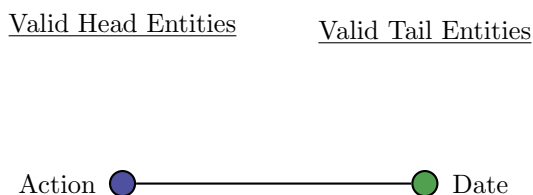


- ★ Example Sentence Mention: (Note that only the considered relation is added below for clarity)

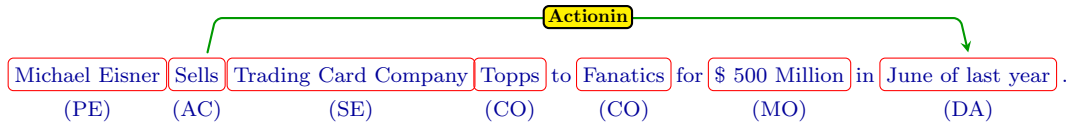


#### Relation 2: Actionin

- ★ Definition: Indicates the *Date* associated with an *Action* entity, signifying the time of occurrence of the action.

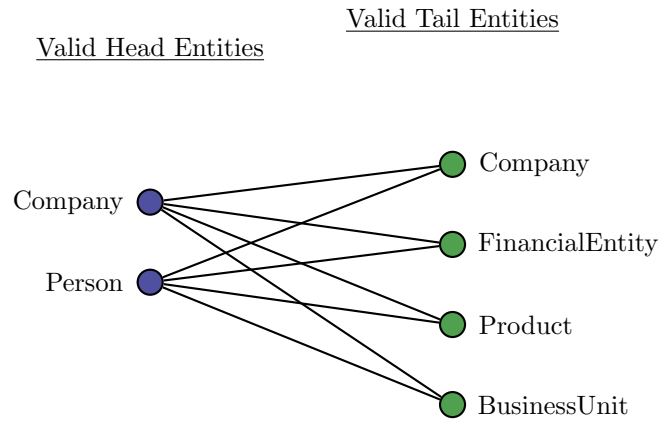


- ★ Example Sentence Mention: (Note that only the considered relation is added below for clarity)

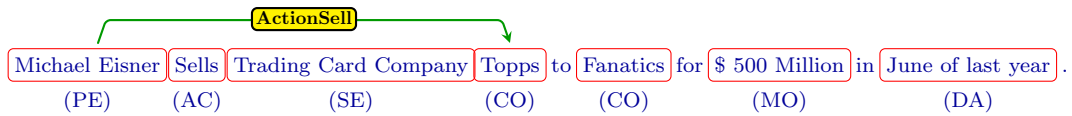


### Relation 3: ActionSell

★ *Definition:* Represents the action of selling a *Company*, *FinancialEntity*, *Product*, or *BusinessUnit* by a *Company* or a *Person*.



★ *Example Sentence Mention:* (Note that only the considered relation is added below for clarity)



#### Relation 4: Employeeof

★ Definition: Denotes the past, present or future employment relationship between a *Person* and a *Company*.

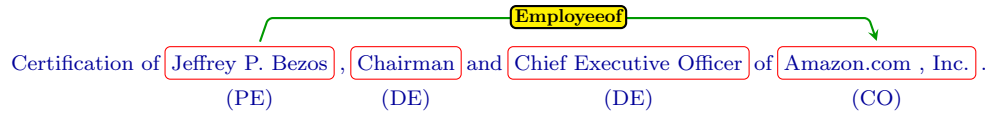
Valid Head Entities

Valid Tail Entities

Person ● ————— ● Company

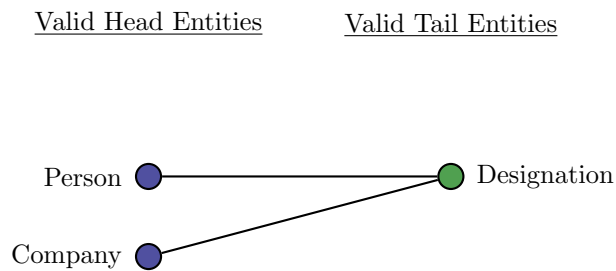
★ Example Sentence Mention: (Note that only the considered relation is added below for clarity)



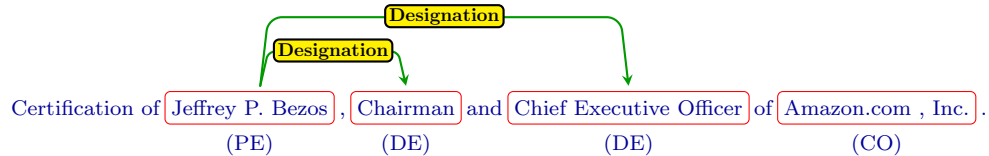


## Relation 5: Designation

- ★ *Definition:* Indicates the job title or position of a *Person*, or the *Designation* of a *Company* in the financial context, providing information about the role or responsibility of the entity. (Do not confuse the *Designation* entity (see 5) with this *Designation* relation).



- ★ *Example Sentence Mention:* (Note that only the considered relation is added below for clarity)

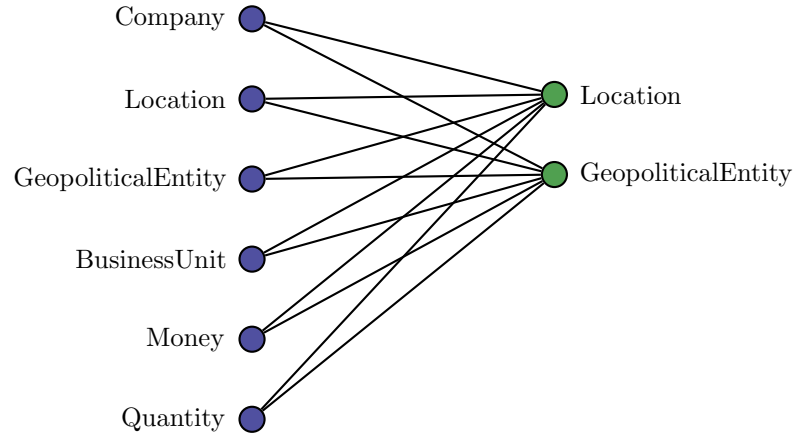


## Relation 6: Locatedin

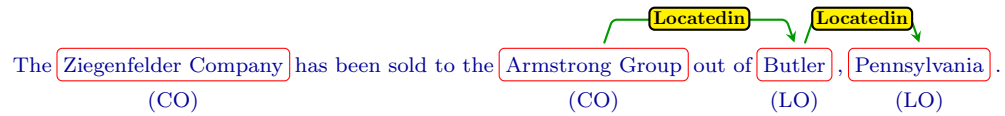
- ★ *Definition:* Indicates the geographical location or country associated with an entity, specifying the place or region where the entity is located. *Money* and *Quantity* can be *Located* in the place where they were generated, lost, profited, etc. Note that a *Company* is only *Located* in a place if it based in that place.

Valid Head Entities

Valid Tail Entities



★ Example Sentence Mention: (Note that only the considered relation is added below for clarity)

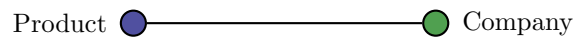


## Relation 7: Productof

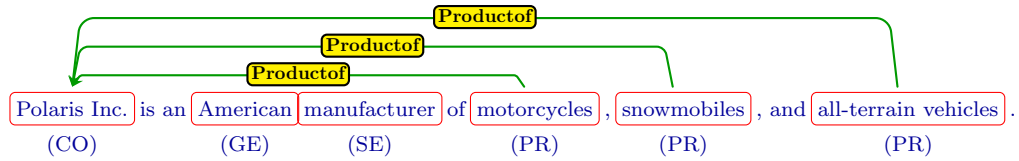
★ Definition: Indicates that a *Product* is manufactured, sold, offered, or marketed by a *Company*, establishing a relationship between the Company and the Product.

Valid Head Entities

Valid Tail Entities

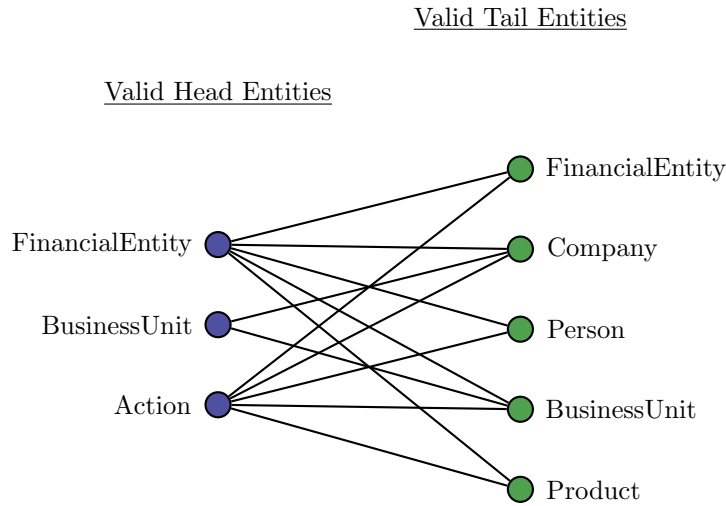


★ Example Sentence Mention: (Note that only the considered relation is added below for clarity)

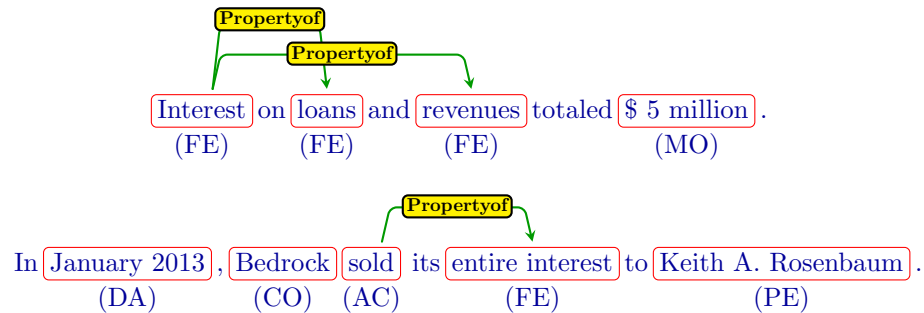


## Relation 8: Propertyof

- ★ *Definition:* Serves as an "umbrella relation" that indicates a general association between two entities, mainly representing **ownership** or **part-of/composition** relationships. This relation is used to connect two entities when a more specific relation is not yet defined. A highly occurring usage is connecting an *Action* entity to the *Company* the action is being **applied to**.



- ★ *Example Sentence Mention:* (Note that only the considered relation is added below for clarity)

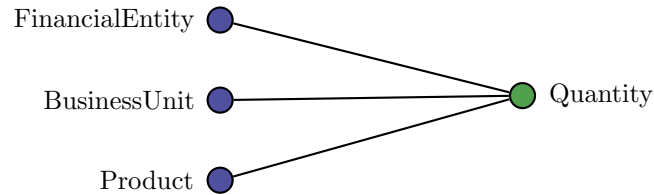


## Relation 9: Quantity

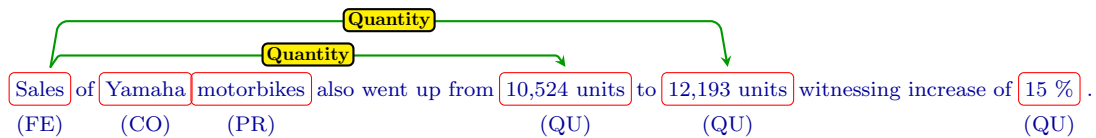
- ★ *Definition:* Represents the **countable** quantity a *FinancialEntity*, *BusinessUnit* or *Product*. (The *Value* entity covers all non-countable numerical values , see 12)

### Valid Head Entities

### Valid Tail Entities



★ Example Sentence Mention: (Note that only the considered relation is added below for clarity)

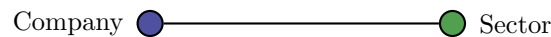


## Relation 10: Sector

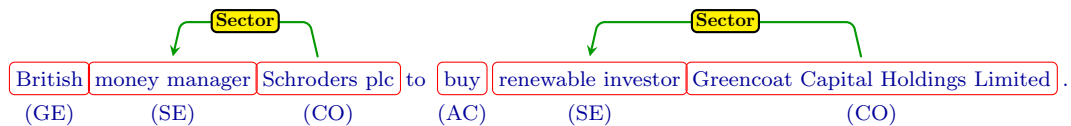
★ Definition: Indicates the economic sector or industry to which a *Company* belongs, providing information about the broad business area or category of the Company's operations. Note: do not confuse the *Sector* entity (see 13) with this *Sector* relation.

### Valid Head Entities

### Valid Tail Entities



★ Example Sentence Mention: (Note that only the considered relation is added below for clarity)



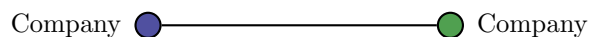
## Relation 11: Subsidiaryof

★ Definition: Indicates that a *Company* is a subsidiary of a parent *Company*, either wholly or majority owned. Note that "brands" are always considered subsidiaries of their parent *Company*. A highly occurring pattern

is a parent company selling its subsidiary company, in which case the *Subsidiaryof* relation is not annotated (see item 2 in relation box 11)

Valid Head Entities

Valid Tail Entities



★ Example Sentence Mention: (Note that only the considered relation is added below for clarity)

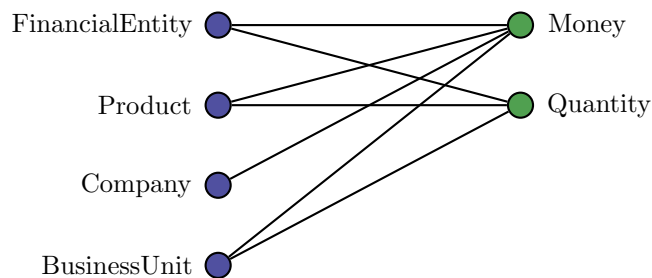


## Relation 12: Value

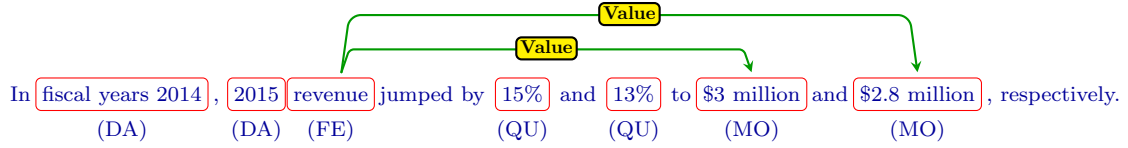
★ Definition: Represents a **non-countable** value of a *FinancialEntity*, *BusinessUnit* or *Product* such as a monetary value or a percentage. A *Company* can also have a *Value* relation, but only for monetary values such as indicating the net worth of a company or the sale price in an acquisition.

Valid Head Entities

Valid Tail Entities

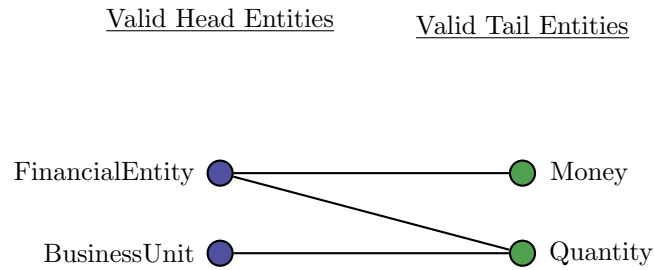


★ Example Sentence Mention: (Note that only the considered relation is added below for clarity)

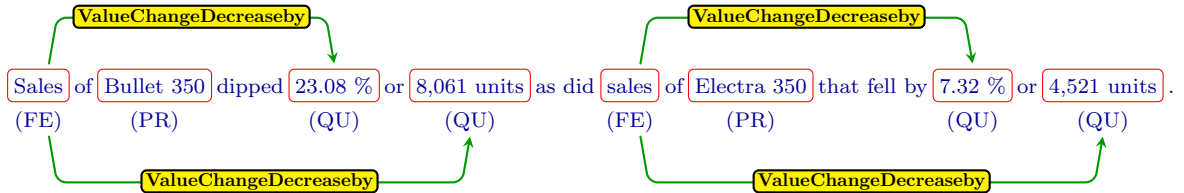


### Relation 13: ValueChangeDecreaseby

- ★ *Definition:* Indicates the decrease in monetary value or quantity of a *FinancialEntity*. An additional more rare use-case is the *Quantity* of a *BusinessUnit* decreasing, such as number of employees or number of offices.



- ★ *Example Sentence Mention:* (Note that only the considered relation is added below for clarity)



### Relation 14: ValueChangeIncreaseby

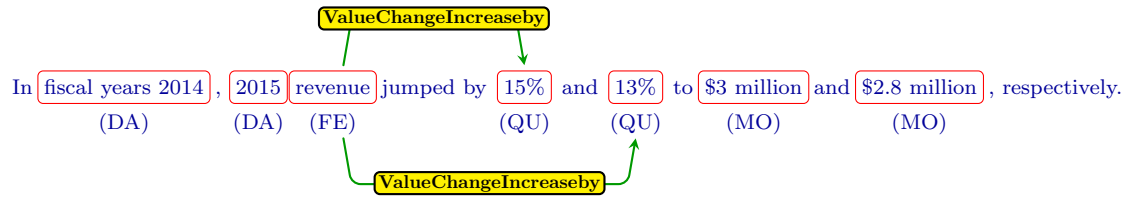
- ★ *Definition:* Indicates the increase in value or quantity of a *FinancialEntity*. An additional more rare use-case is the *Quantity* of a *BusinessUnit* increasing, such as number of employees or number of offices.

Valid Head Entities

Valid Tail Entities



★ Example Sentence Mention: (Note that only the considered relation is added below for clarity)

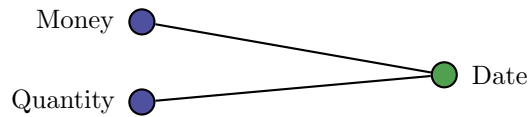


## Relation 15: Valuein

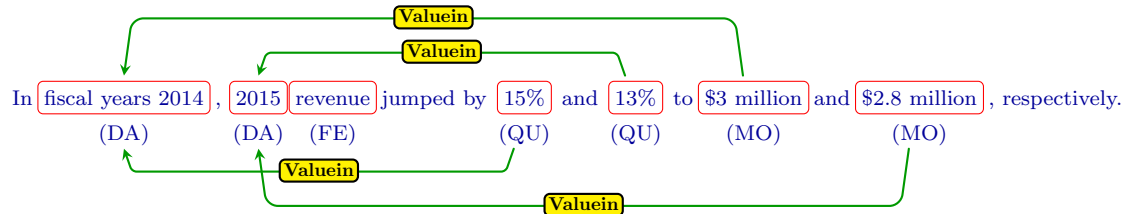
★ Definition: Indicates the *Date* associated with a *Money* or *Quantity* entity, providing information about the specific time period to which the *Money* or *Quantity* value is related.

Valid Head Entities

Valid Tail Entities



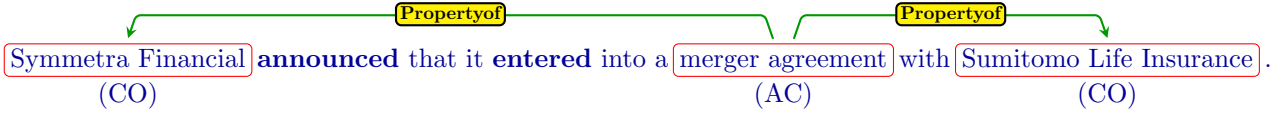
★ Example Sentence Mention: (Note that only the considered relation is added below for clarity)



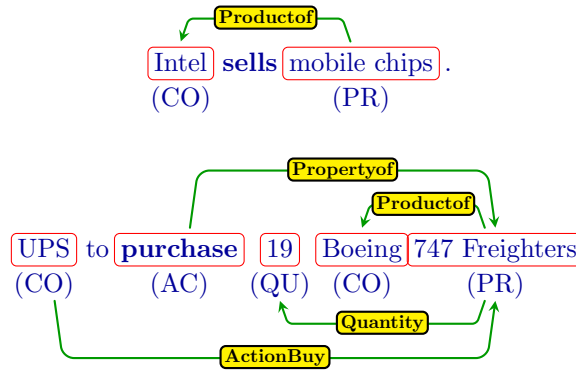
## 4 Detailed Entity Annotation Rules

### Entity 1: Action (AC)

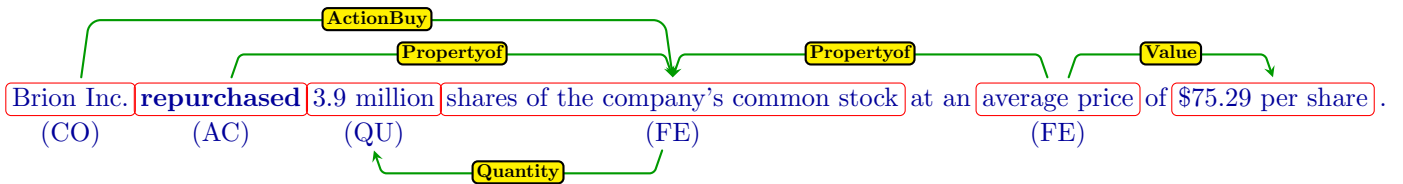
- Any verb/action outside the financial market context is **not** an *Action* entity, even if it's highlighting a new event that occurred. Note in the example below, the verbs “announced” and “entered” are generic verbs and do not constitute an *Action* entity, whereas “merger agreement” is indeed an event in the financial market context.



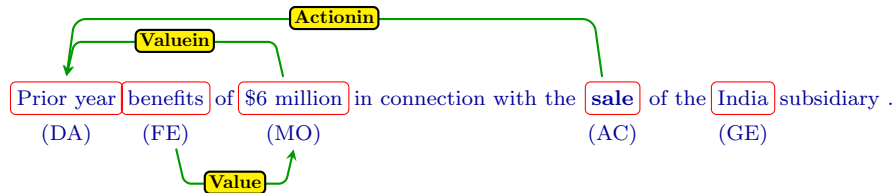
- The regular act of buying/selling any type of entity outside of a new event is **not** an *Action* entity. Note in the first example below, “sells” is not an *Action* entity since the company selling its product is a regular event, whereas in the second example, UPS “purchasing” the Freighters is a new event that occurred.



- The Action of buying/selling of FinancialEntities such as shares or ownership interest should be labeled as *Action* entity.



- Action* entities can take different parts-of-speech, i.e. an *Action* entity is not necessarily a verb (e.g. acquisition, merger and sale are nouns).



- Action* vs *Sector*: *Action* entities highlight some event that occurred in the financial market. Verbs such as produce, manufacture, market, etc of goods and services are considered a *Sector* entity and as such these should not be labeled as *Action* entities.





We entered into an agreement to **sell** **Wallop**'s **naval business** .  
 (AC) (CO) (BU)

**Coric** recently started expanding into **auto business industry** .  
 (CO) (SE)

**Ingles Markets, Incorporated (ingles or the Company)** is a leading **supermarket chain** in the **southeast United States** .  
 (CO) (SE) (LO)

5. *BusinessUnit* vs *Product*: A program/initiative/plan of a *Company* is to be always annotated as a *BusinessUnit* entity, even if it is named after a *Product* of the *Company*.

**Cardium Therapeutics** to advance the **Generx program** .  
 (CO) (BU)

### Entity 3: Company (CO)

1. A brand, and even a trademark, of a *Company* is considered a separate *Company* and is annotated as such. A *Subsidiaryof* relation will exist between the brand and the parent *Company*.

**Rebel Foods** operates **9** sub - brands including **Faasos** and **Behrouz Biryani** .  
 (CO) (QU) (CO) (CO)

2. Overlap *Company* & *GeopoliticalEntity/Location*: When a country/location is part of a *Company* name, e.g. “Intel Germany”, annotate the phrase including the country/location as a *Company* entity. No *GeopoliticalEntity/Location* should be annotated and thus no *Locatedin* relation exists. Note in the first sentence below where this pattern occurs. Conversely, note that in the second sentence how “Finnish” is not part of the *Company* name so it is annotated as a separate *GeopoliticalEntity* and a *Locatedin* relation exists.

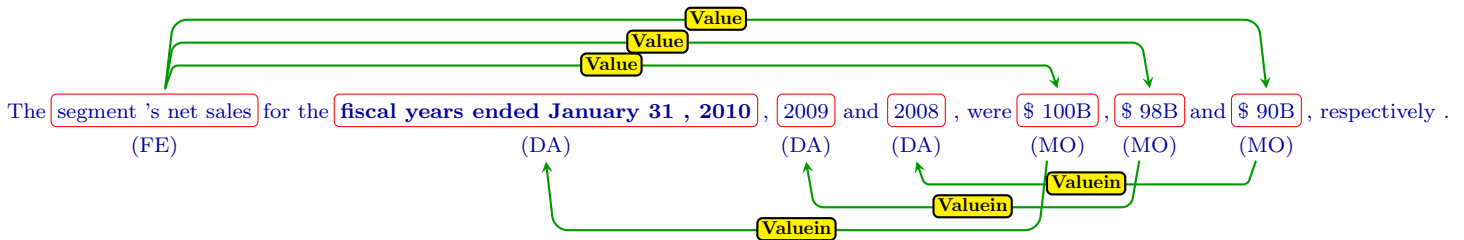
**Rallis India Ltd** , a subsidiary of **Tata Chemicals** , on **Wednesday** reported a **13.3 per cent** fall in its **consolidated net profits** .  
 (CO) (CO) (DA) (QU) (FE)

**Finnish** **Aldata Solution** has signed a contract of supply its **G.O.L.D. system** to **two** **French** **retail chains** .  
 (GE) (CO) (PR) (QU) (GE) (SE)

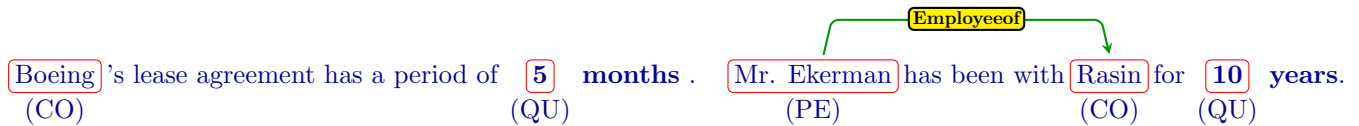
3. Overlap *Sector* & *Company*: Refer to item 5 in entity box 11 (*Product*)

## Entity 4: Date (DA)

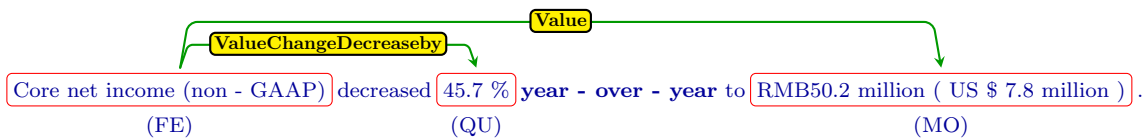
1. Time-related prefixes/suffixes such as “years ended, fiscal year, last quarter, beginning of” should be included in the *Date* entity.



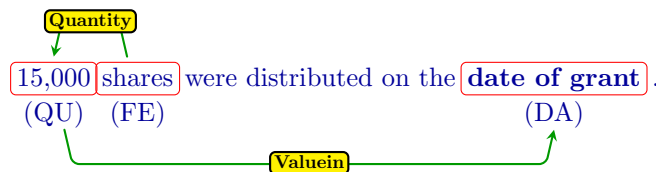
2. Time duration is not a *Date* entity.



3. “year-over-year”, “y-o-y”, “yearly” are not *Date* entities.

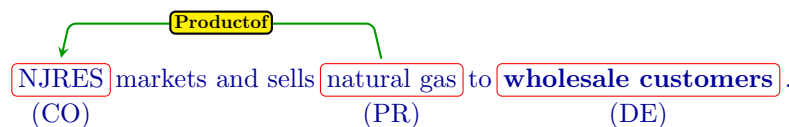


4. Implicit/reference dates (dates that do not point directly to a point in time) are considered *Date* entities, e.g. “to this date”, “prior year”, “as of today”.

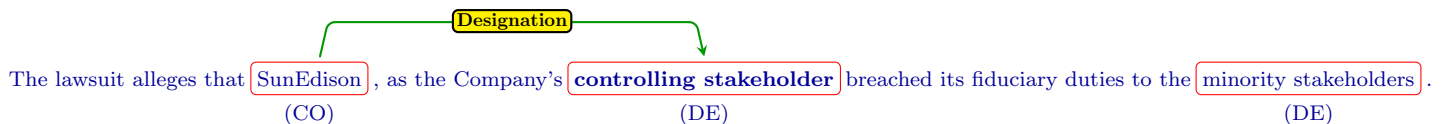


## Entity 5: Designation (DE)

1. *Designation* can be a generic role such as “consumer”, “third party” or “customer”.

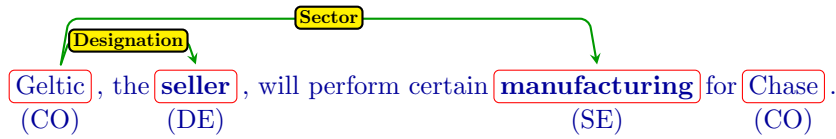


2. In addition to a *Person*, a *Company* can also take a *Designation*, e.g. the role of a *Company* in a transaction.



3. *Designation* vs *Sector*: Any role that describes a *Company* as the producer of a *Product*, not simply a seller or marketer, is labeled as a *Sector* entity. Examples include “manufacturer”, “producer”, “designer”, etc. All other simple roles such

as “seller”, “marketer”, etc. are *Designation* entities.



4. Overlap *Designation* vs *BusinessUnit*: The job title of an employee can sometimes contain the name of a *BusinessUnit*, e.g. “head of Finance”. In this case, the *Designation* and *BusinessUnit* entities should be annotated separately.

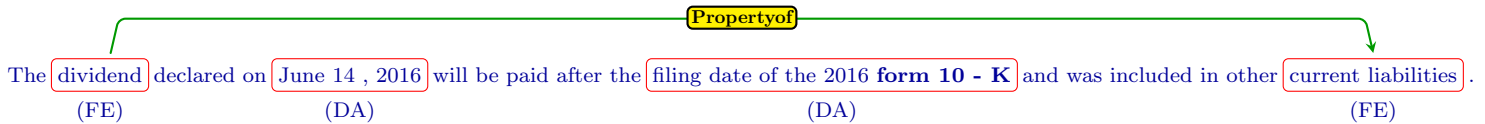


5. Any job description, even outside the financial context, is a *Designation* entity.

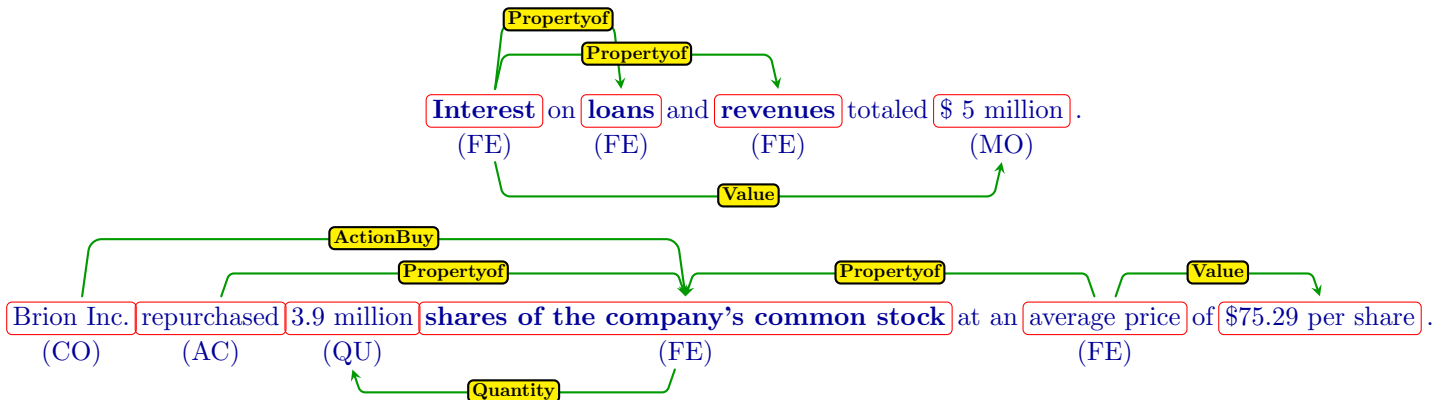


## Entity 6: FinancialEntity (FE)

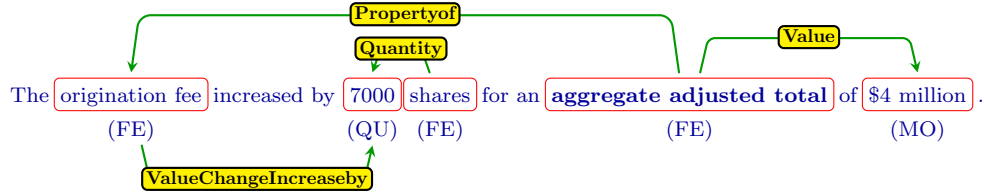
1. Financial entities are entities that can take a monetary value. As such, financial statements and reports such as consolidated financial statement, 10-K and 10-Q are **not** a *FinancialEntity*, as they can't take a monetary value. Notice in the below example how the “form 10-K” is actually part of a *Date* entity and is not a *FinancialEntity* by itself.



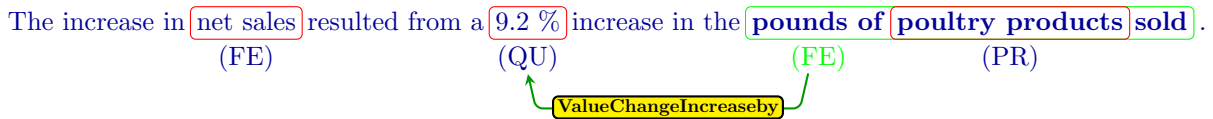
2. When to separate *FinancialEntity*: Financial entities occur ubiquitously in the dataset as expected, and as such it is particularly challenging to decide when to label a phrase as one *FinancialEntity* versus when to separate into individual ones. The general rule will be to decide based on the context: if the phrase is describing one concept as a whole or if sufficiently distinct entities can be understood. Given below is an example of each case. Note that although the phrase in the first example is shorter than the second one, it is still separated into multiple entities, i.e. length alone is not an indicator.



- General “Price” of a *FinancialEntity*: The value of a *FinancialEntity* is sometimes expressed through a general price term, e.g. “average total price”, “total lump value”, etc. In this case, the general price term and the *FinancialEntity* are lumped together into one entity if they occur contiguously in text, e.g. “**average stock price**”, otherwise two separate *FinancialEntities* are annotated, e.g. “the **total price** of the Company’s **ownership interest**”. The two entities are then linked through a *Propertyof* relation.



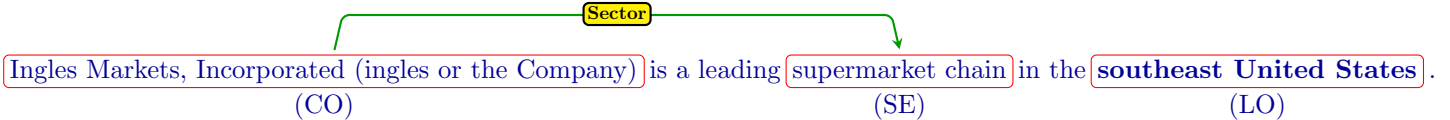
- Overlap *FinancialEntity* & *Product*: In some cases, the amount of a product sold is given a value, e.g. “\$4 million in GPUs sold”. In this case, two overlapping entities need to be labeled, the *Product* entity (“GPUs”) and the *FinancialEntity* (“GPUs sold”).



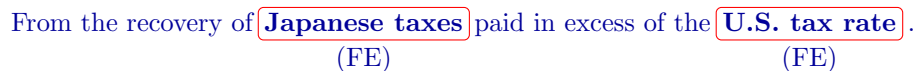
- Overlap case *FinancialEntity* and *GeopoliticalEntity/Location*: Refer to item 2 in Entity box 7 (*GeopoliticalEntity*)

## Entity 7: GeopoliticalEntity (GE)

- Regions of a country are a *Location* entity not a *GeopoliticalEntity*, e.g. “southeast United States”



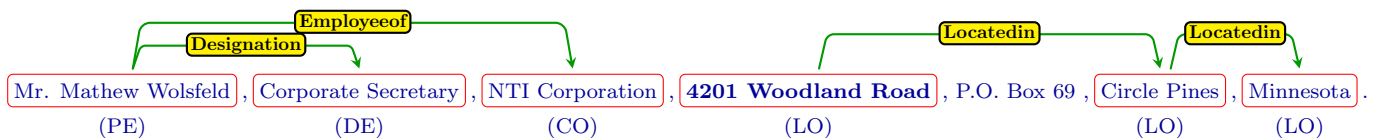
- Overlap case *GeopoliticalEntity/Location* and *FinancialEntity*: Countries/Locations when used as a modifier to a *FinancialEntity*, e.g. “French loans”, are not to be annotated separately. Instead, the whole phrase is annotated as one *FinancialEntity* and no *Location* or *GeopoliticalEntity* is added.



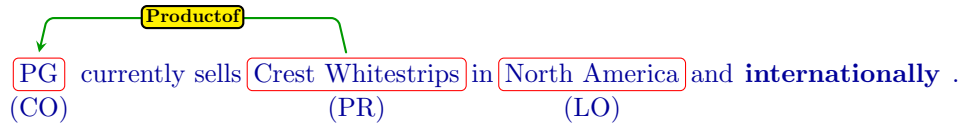
- Overlap *GeopoliticalEntity* vs *Company*: Refer to item 2 in Entity box 3 (*Company*)

## Entity 8: Location (LO)

- Streets names and numbers are *Location* entities.



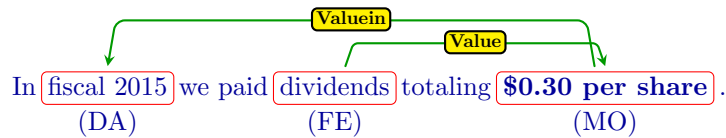
- Generic locations such as “globally”, “internationally”, “around the world”, etc. are **not** *Location* entities.



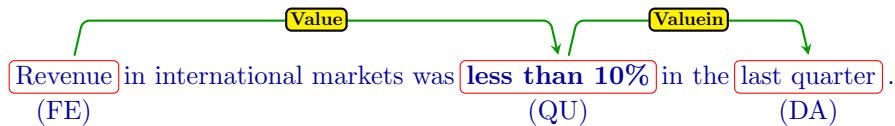
- Regions of a country are a *Location* entity, e.g. “southeast United States”. Refer to item 1 in Entity box 7 (*GeopoliticalEntity*)
- Location* vs *BusinessUnit*: Refer to item 3 in Entity box 2 (*BusinessUnit*)
- Overlap case *Location* and *Company*: Refer to item 2 in Entity box 3 (*Company*)
- Overlap case *GeopoliticalEntity/Location* and *FinancialEntity*: Refer to item 2 in Entity box 7 (*GeopoliticalEntity*)

## Entity 9: Money (MO)

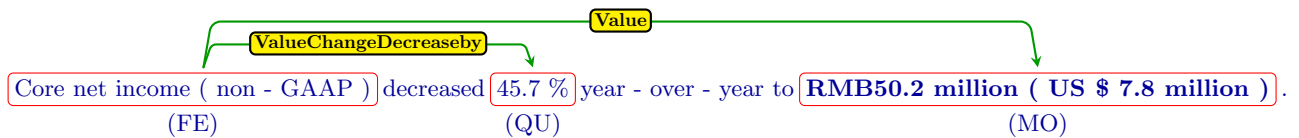
- Modifiers/Prepositions: Include modifiers/prepositions in the *Money* entity which are part of the actual value such as a currency e.g. “\$5 per share” or “10 million Japanese Yen”.



- Inexact values: When the value of a *Money* or *Quantity* entity is not exactly mentioned, e.g. “over 20%”, “under \$1 million”, “maximum of 20 crore”, etc. then include the modifier in the entity phrase. Do not add meaningless modifiers such as “approximately”, “almost”, etc.

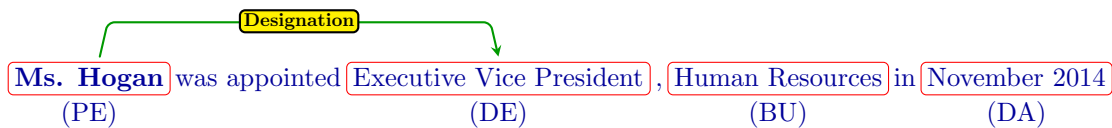


- Two currencies: When a *Money* entity is listed under two different currencies, group the two currencies into one *Money* entity if they are contiguous in text, otherwise annotate separately.



## Entity 10: Person (PE)

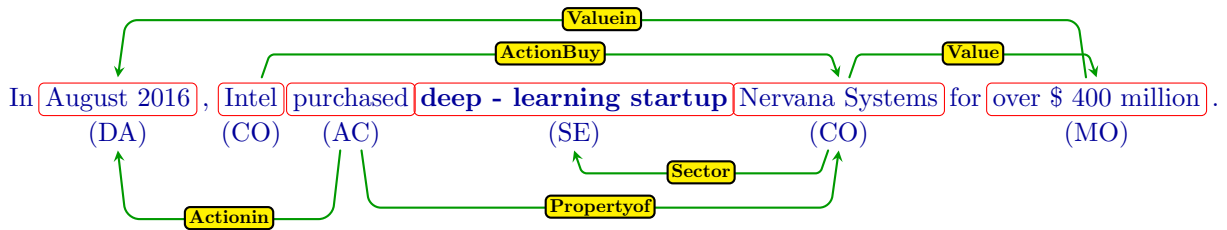
- Only label named persons as a *Person* entity. Pronouns such as “he”, “she”, “they”, etc. should **not** be labeled.
- Include a person’s title such as “Ms.”, “Mr.”, “Dr.”, etc. in the entity phrase.



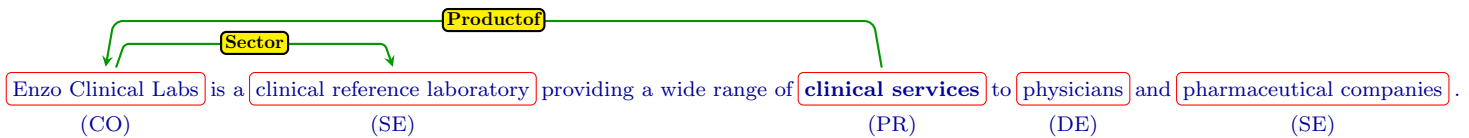
### Entity 11: Product (PR)

Since *Product* and *Sector* entities are interrelated, the first two points help explain the distinction between the two entities.

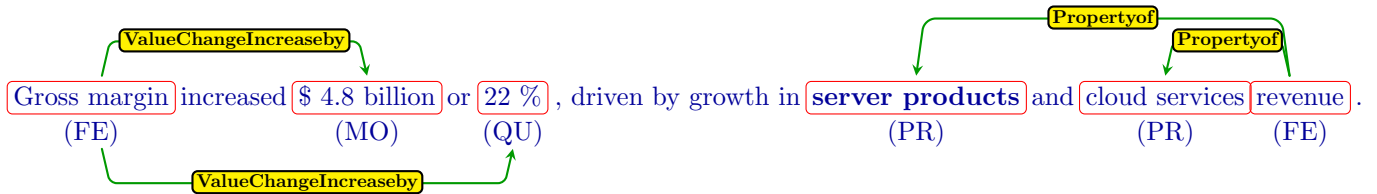
1. The *Product* entity can be easily confused with the *Sector* entity. Some cases are easy to spot; *Product* tends to be something more specific, like “iPhone”, “2080Ti GPU”, while a *Sector* infers a more general area of products, like “Tech”, “Healthcare”. Between these two extremes, a lot of other examples tend to be much more confusing, such as “semiconductor chips”, “computer services” which can reasonably be understood as being both a *Product* and a *Sector*.
2. Monetary value: To resolve the confusion, the rule will be as follows: any physical object or a service that can be sold/provided for a monetary value is considered a *Product* entity. Then, our previous examples of “semiconductor chips” and “computer services” should be labeled as *Product* entities. The exception is when a product is explicitly mentioned as a sector of a company, usually using words such as “business”, “firm”, “startup”, etc. e.g. “Apple is in the **phone business**”, or using a word as an adjective of the company e.g. , “Intel bought the **GPU startup** Graphistry”. In these cases, the entities are labeled as *Sector* because they are explicitly referred to as a sector of a company. Had these same exact entities occur in a different context, such as in “Apple sells **mobile phones**”, they should be labeled as *Product*.



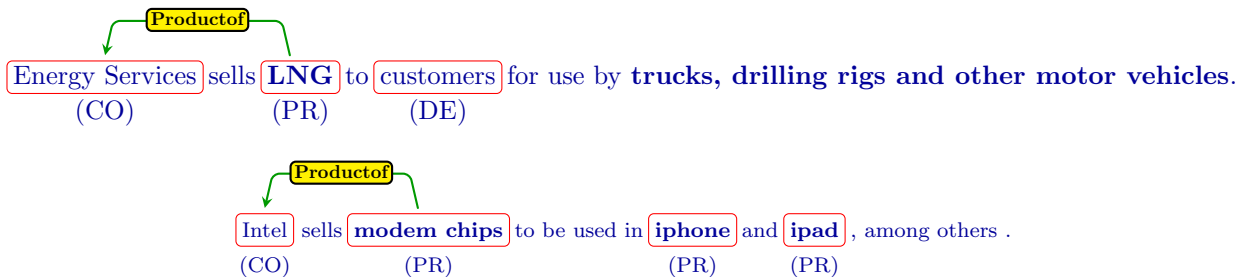
3. Services provided by a company, e.g. “cloud services”, “medical services” are a *Product* entity. The exception is again when the entity is explicitly stated as a *Sector* or is used as a *Company* descriptor, e.g. “the **software services firm** Gile Inc.”



4. Products: When the word “products” occurs next to an actual *Product* entity, add it to the entity, e.g. “poultry products”

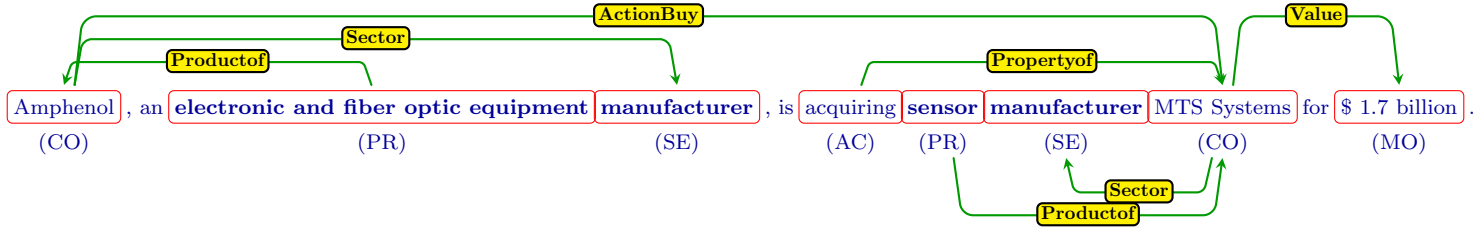


5. Generic vs Named Products: When generic products/objects are listed in sentence without reference as being a *Product* to some *Company*, they should not be annotated as a *Product* entity. Compare “Company A manufactures **cars** and **trucks**.” versus “Company B sells certain **automotive parts** for use in cars and trucks.” In the first example, “cars” and “trucks” are *Products* of the *Company* and should be labeled as such, whereas in the second example, their mention does not warrant a *Product* entity label. Products which are named (not generic), e.g. “windows 7”, are labeled as a *Product* entity even when the manufacturing company is not mentioned in the context.

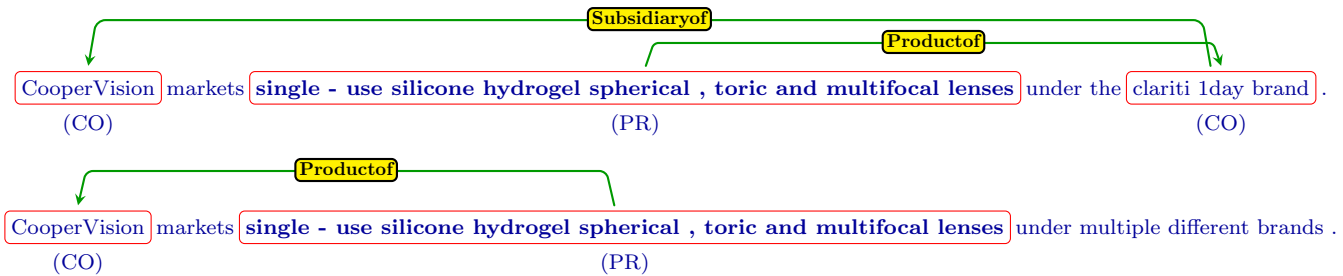




6. Overlap case, *Sector* & *Product*: Always try to separate between *Product* and *Sector* entities, e.g. “manufacturer of eyeglasses”, label “eyeglasses” as a *Product* and “manufacturer” as a *Sector*.



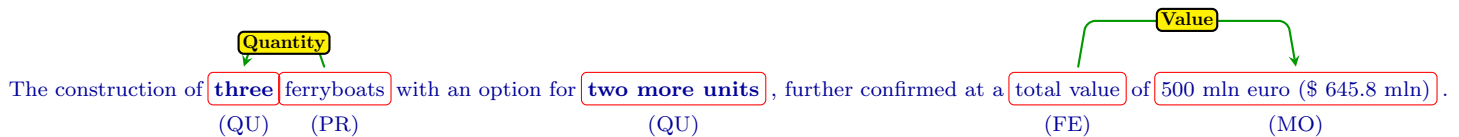
7. *Product* and brands of *Company*: In a sentence where both a brand *Company* and its parent *Company* are mentioned, and where a *Product* entity of the brand *Company* exist, only annotate one *Product* relation between the *Product* and the brand *Company* (i.e. Do not add a *Productof* relation between the *Product* and the parent *Company* of the brand). In the case where the brand *Company* name is not explicitly mentioned, add a *Productof* relation with the parent *Company*. Note in the first sentence below how the *Product* is associated with the brand name, while in the second sentence it is associated with the parent *Company* “CooperVision” since the brand name is not explicitly mentioned.



8. *Product* vs *BusinessUnit*: Refer to item 5 in Entity box 2 (*BusinessUnit*)
9. Overlap *Product* and *FinancialEntity*: Refer to item 4 in Entity box 6 (*FinancialEntity*)

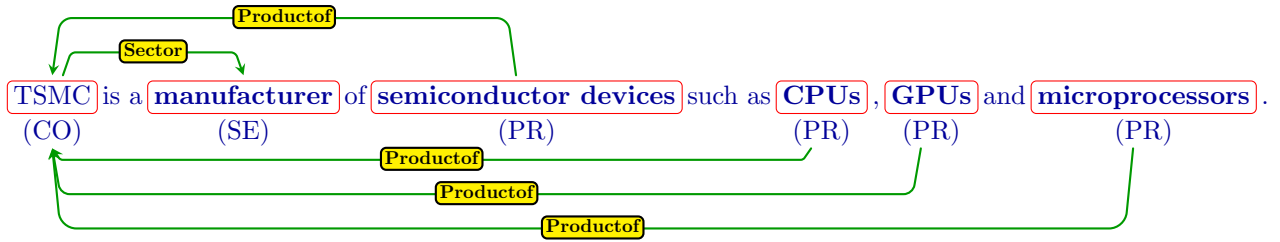
## Entity 12: Quantity (QU)

1. Inexact values: Refer to item 2 in Entity box 9 (*Money*)
2. Include additional unit descriptors which are not a different entities in themselves, e.g. “100 cm”, “2000 tons”, “500 units”. Unlike in the examples “200 shares” or “500 employees” where “shares” is a *FinancialEntity* and “employees” is a *BusinessUnit* entity.

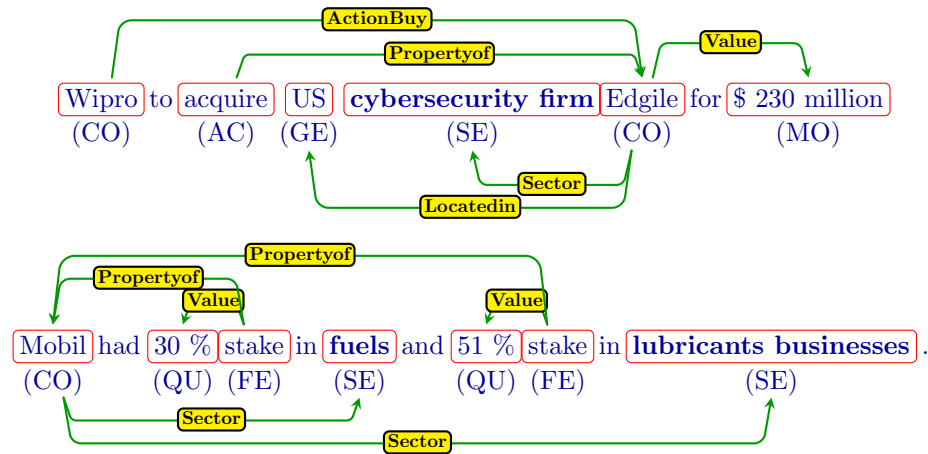


## Entity 13: Sector (SE)

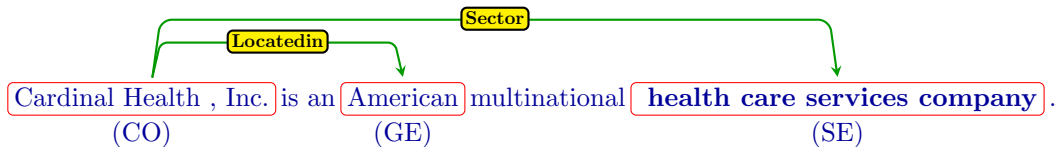
1. Check first two points in Entity box 11 (*Product*) for details to clarify confusion between the *Sector* entity and the *Product* entity.
2. Common pattern: A very common pattern is as follows: “The company is a [supplier/manufacture/seller/designer] of [general Product] such as [Specific Product 1], [Specific Product 2] and [Specific Product 3].” In this case, the [general Product] and all [specific products] are labeled as *Product* entities, while the *Company* description [supplier/manufacture/seller/designer] is not always a *Sector* entity. Meaningful descriptions such as “manufacturer/designer/developpe are examples of a *Sector* while more general roles such as “buyer/seller” are not *Sector* entities. Refer to item 3 in Entity box 5 (*Designation*) for more details.



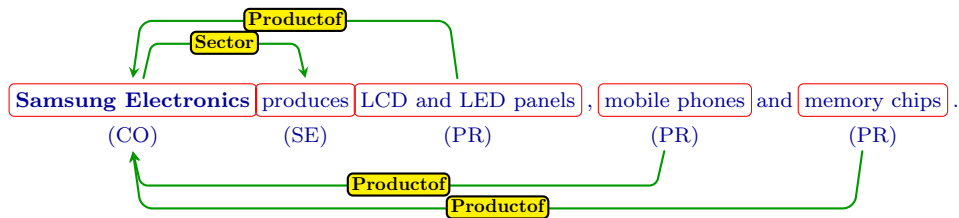
3. Always add modifiers/descriptors to *Sector* entity, such as “business, segment, firm, unit, startup, company or sector”.



4. International and Private/Public Sectors: Terms like International, Multinational, or Local are not considered part of the 'Sector' entity unless they are integral to the business's official description, such as “**regional food supplier**”. The same rule applies to the designations Private or Public. For instance, in the phrase “**public accounting firm**” the term 'public' would be considered part of the 'Sector' entity as it is integral to the description of the business. It denotes a specific type of accounting firm that deals primarily with publicly-traded companies. On the other hand, in the phrase “public **university**”, 'public' doesn't describe the type of service provided or the sector the entity belongs to, but rather the funding source of the institution.



5. Overlap case, *Company* & *Sector*: If the sector is part of the company name, do not add a separate *Sector* entity, e.g. “Enzo Pharmaceuticals”, do not label “Pharmaceuticals” as a *Sector* entity, it is part of the company name.

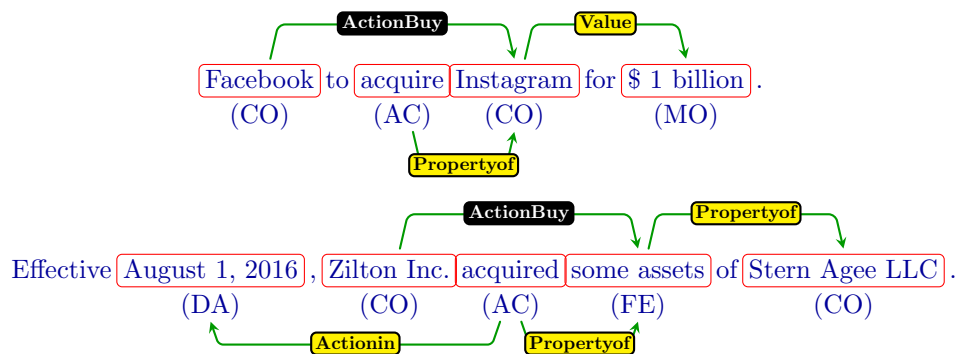


6. Overlap *Sector* vs *Product*: Refer to item 6 in Entity box 11 (*Product*)
7. *Sector* vs *Designation*: Refer to item 3 in Entity box 5 (*Designation*)
8. *Sector* vs *Action*: Refer to item 5 in Entity box 1 (*Action*)
9. *Sector* vs *BusinessUnit*: Refer to item 4 in Entity box 2 (*BusinessUnit*)

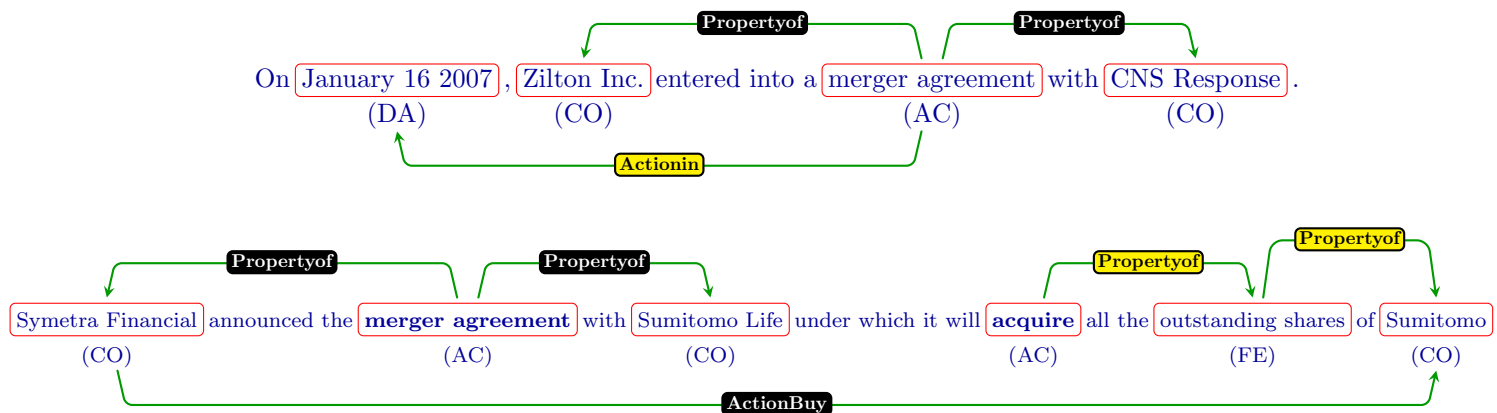
## 5 Detailed Relation Annotation Rules

### Relation 1: ActionBuy

1. Majority vs Minority (and Intermediate *FinancialEntity*): A very common pattern is as follows: “Company A acquired [shares/equity/stake] of Company B”. In this case, the *ActionBuy* relation is to be annotated between “Company A” and “Company B” if it acquired at least a majority stake of “Company B” (or all assets). Otherwise, *ActionBuy* relation is between “Company A” and *FinancialEntity*. Note that in both cases, an additional *Propertyof* relation is needed between the seller *Company*, i.e. “Company B”, and the intermediate *FinancialEntity* as well as between the *Action* entity and the intermediate *FinancialEntity*.

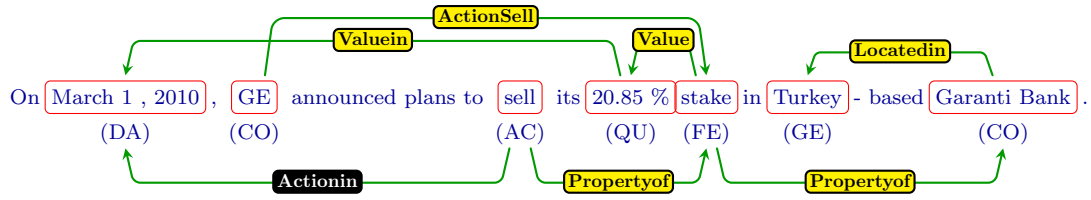


2. Transferring Ownership: *Subsidiaryof* and *ActionBuy/ActionSell*: See item 2 in relation box 11
3. Merger: A “merger” between two companies does not directly imply an *ActionBuy* or *ActionSell* relation, unless explicitly stated which *Company* acquired the other *Company*. “Merger” is always linked to both *Companies* involved using the *Propertyof* relation. Notice in the second sentence below how “Symetra Financial” has an *ActionBuy* relation since it was clarified that “Symetra Financial” is the *Company* acquiring the other *Company*. Also note in the two sentences below how the word “agreement” is always added to the *Action* entity, “merger agreement”



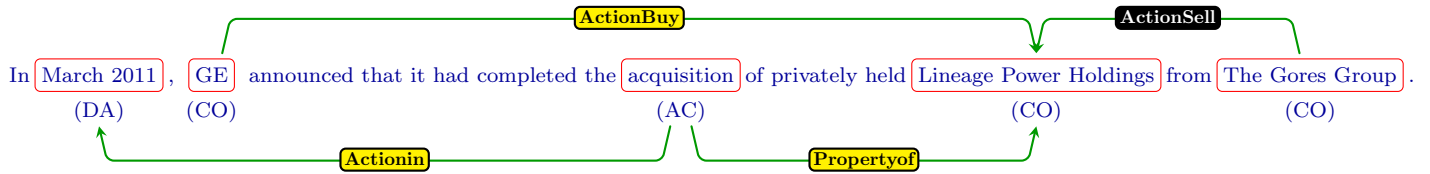
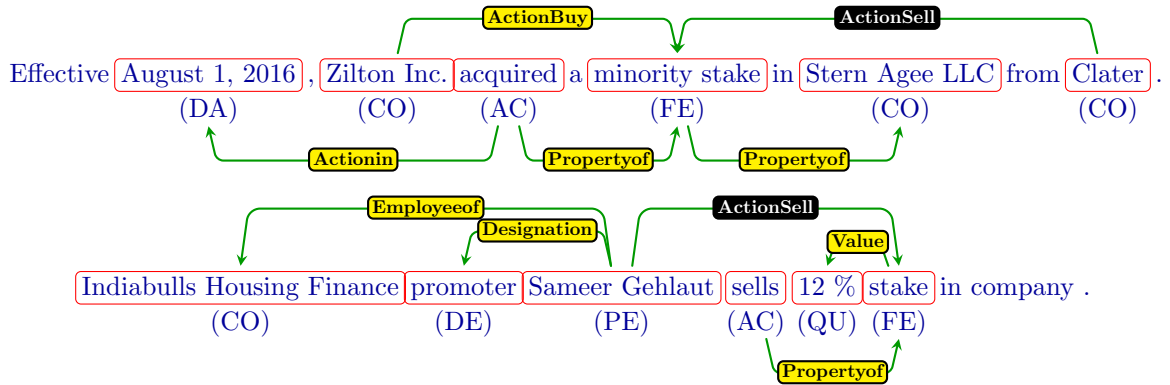
### Relation 2: Actionin

1. Plan date vs Action date: Announcing plans to an *Action* is treated the same as completing the *Action*, i.e. an *Actionin* relation is added.



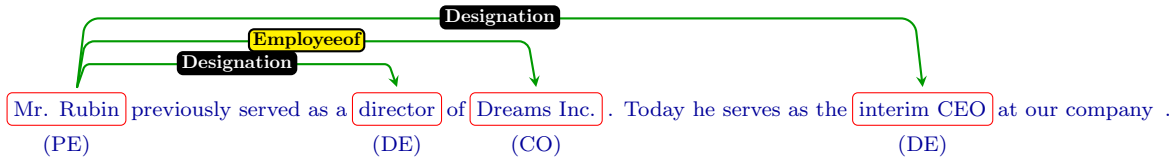
### Relation 3: ActionSell

1. Same rules apply to *ActionBuy* relation, check relation box 1
2. Transferring Ownership: *Subsidiaryof* and *ActionBuy/ActionSell*: See item 2 in relation box 11
3. Some more examples are shown below.

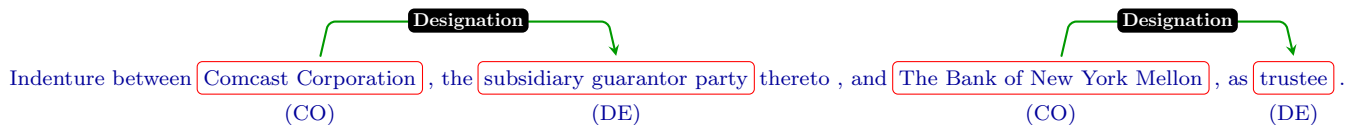


### Relation 4: Designation

1. Note: Do not confuse the *Designation* entity (see 5) with this *Designation* relation.
2. All tenses: past, present and future *Designations* are linked to the *Person* or *Company* through the *Designation* relation.

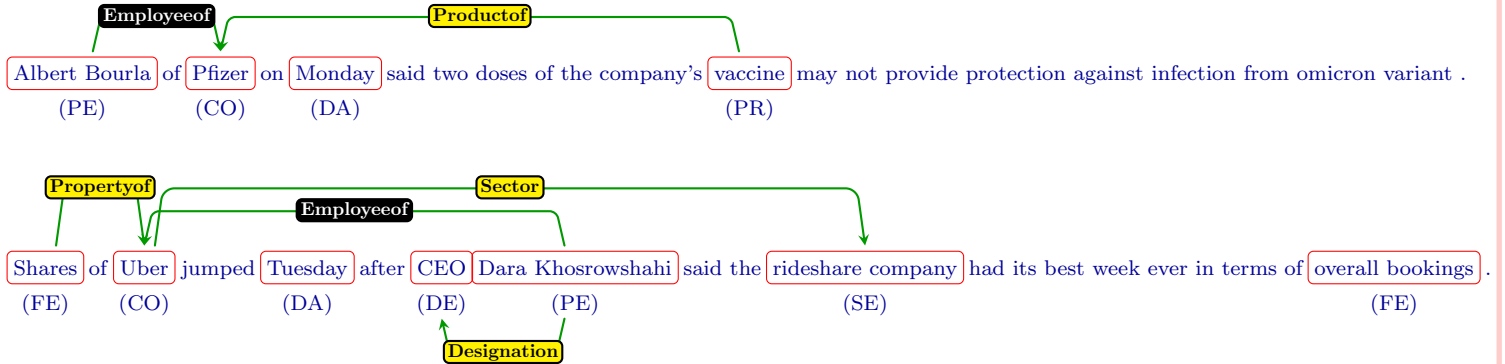


3. *Company & Designation*: Companies can also take the *Designation* relation, usually describing the role in a financial transaction.

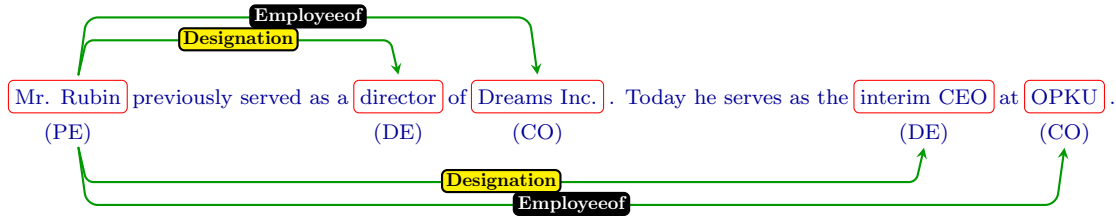


## Relation 5: Employeeof

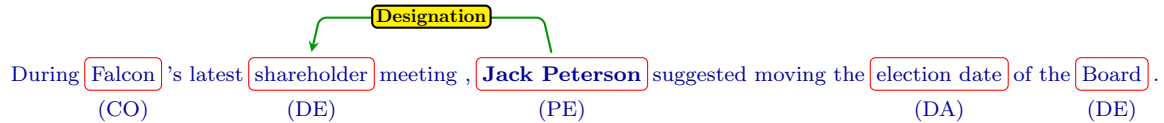
- The *Employeeof* relation can be stated explicitly through a *Designation* entity, e.g. “CEO”, “president” or can be implied, e.g. “Tim Cook of Apple”.



- All tenses: past, present and future employments are linked to the *Person* through the *Employeeof* relation.

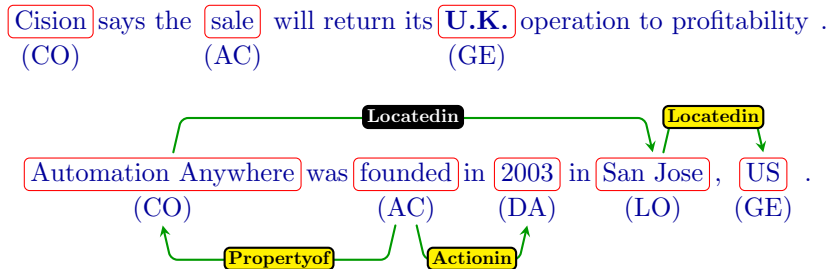


- A *Person* simply owning shares of a *Company* is **not** an employee of the company.

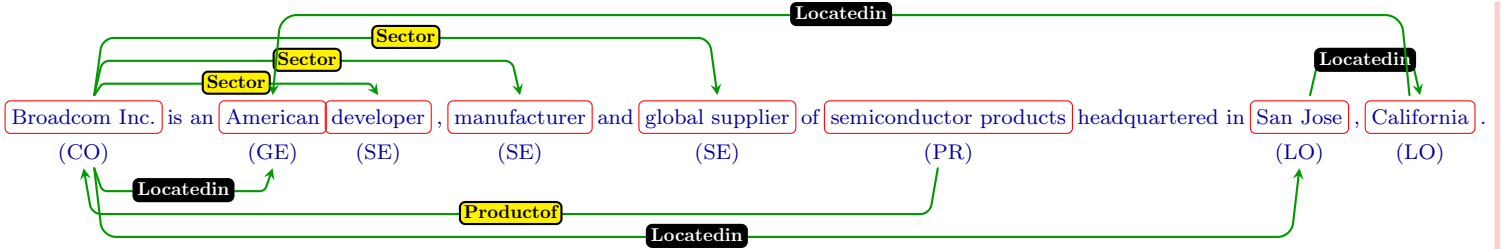


## Relation 6: Locatedin

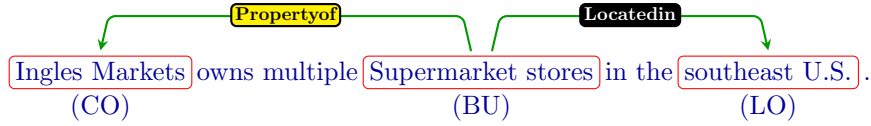
- Company* and *Locatedin*: A *Company* has a *Locatedin* relation with a *Location* or *GeopoliticalEntity* only if it is based in that location, i.e. it is headquartered there. Having branches, selling products or generating revenue in a location does not warrant a *Locatedin* relation.



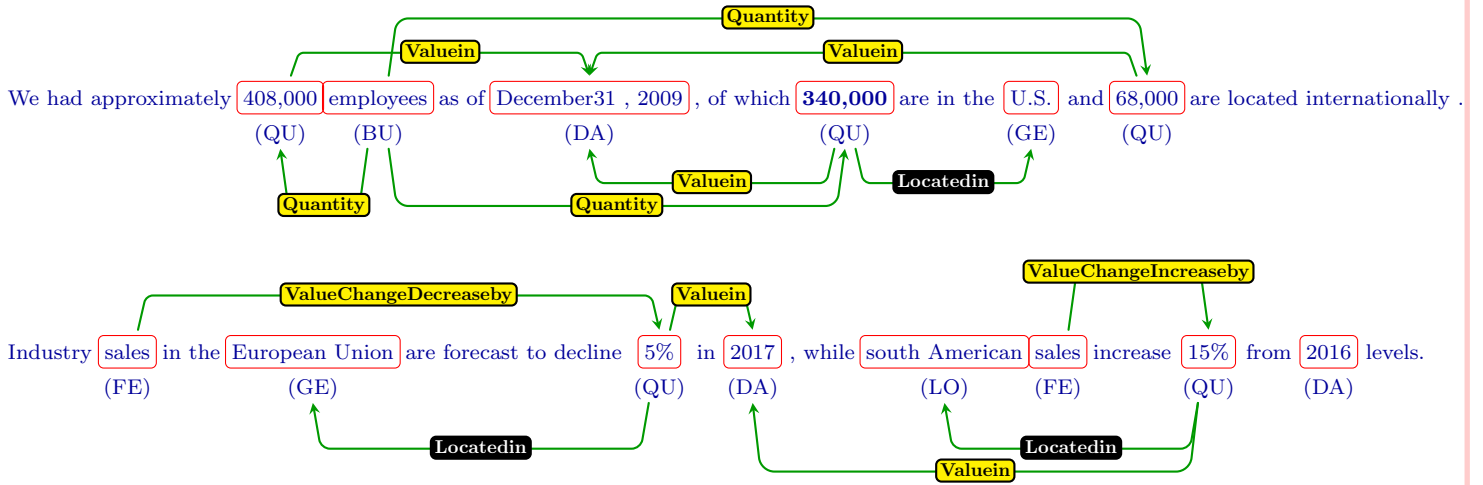
- Nested locations: “A–>B–>C” pattern, label “A” *Locatedin* “B” and “B” *Locatedin* “C”. A very common pattern is the following: “The American Company is headquartered in city, state”. In this case, four *Locatedin* relations need to be added: [company–*Locatedin*–American], [company–*Locatedin*–city], [city–*Locatedin*–state], [state–*Locatedin*–American]



3. *BusinessUnit* and *Locatedin*: A *BusinessUnit*, e.g. branch/factory/plant/facility, can take a *Locatedin* relation.

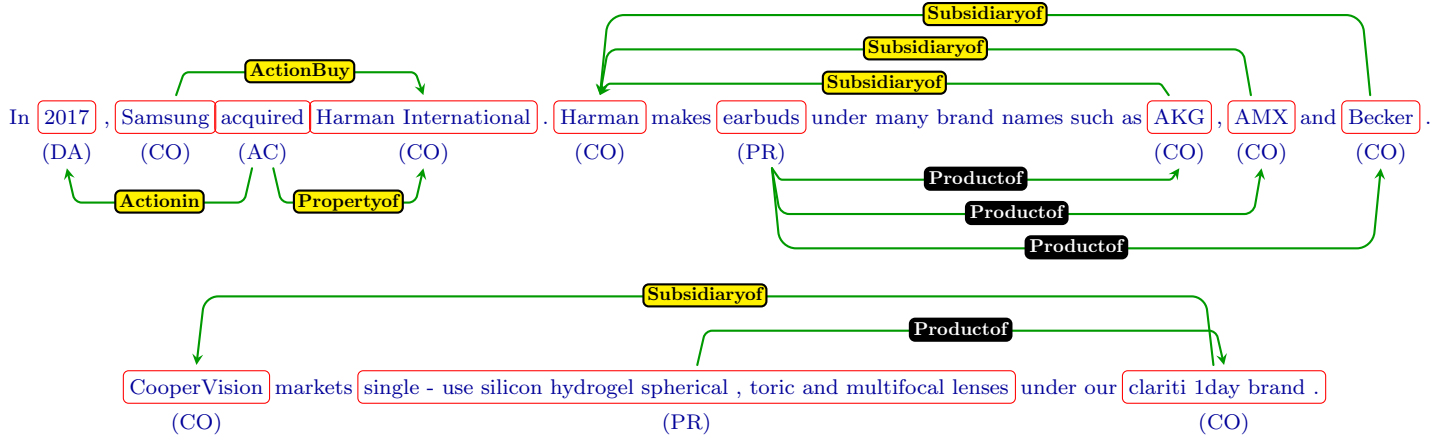


4. *Quantity/Money* and *Locatedin*: *Quantity* and *Money* entities can take a *Locatedin* relation. Example: A *Quantity* could be the number of products sold in a *Location* while *Money* could be the revenue generated in a *Location*.



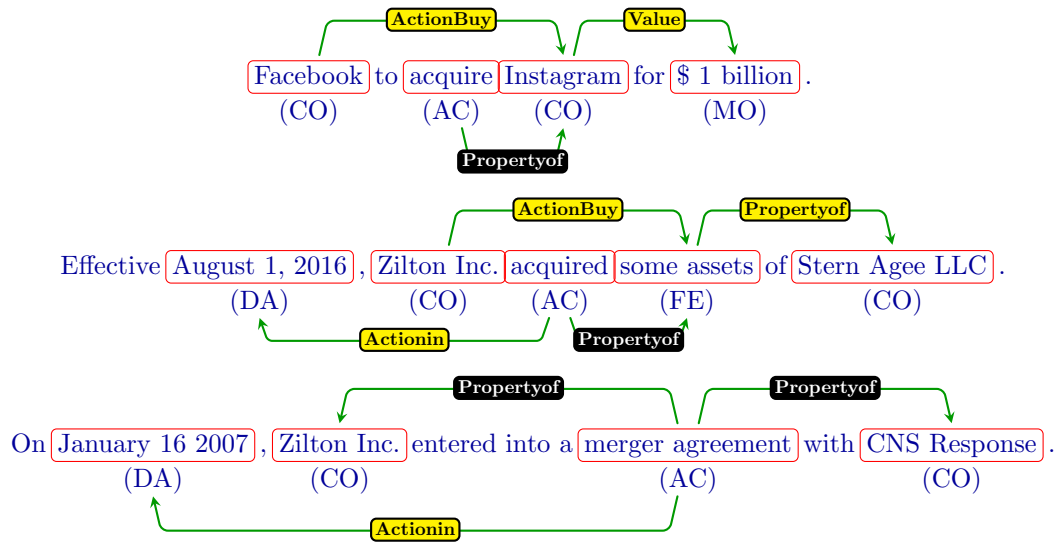
## Relation 7: Productof

- Any *Product* that is manufactured/marketed/sold by a *Company* is a *Product* of that *Company*. If multiple *Companies* are involved in the process, e.g. one *Company* manufactures the *Product* while another *Company* markets it, then the *Productof* relation is added to both *Companies*.
- Product of Subsidiaries/Brands: If the *Product* of a subsidiary company is mentioned, do not add a *Productof* relation for the parent *Company*, this should be deduced from the *Subsidiaryof* relation. Similarly, in cases where a product of “Company A” is sold/marketed under its brand name “Company B”, add the *Productof* relation only for the subsidiary “Company B”. Notice in the example below how the *Product* “earbuds” is annotated as the *Productof* the brand names, not the *Company* “Harman”.

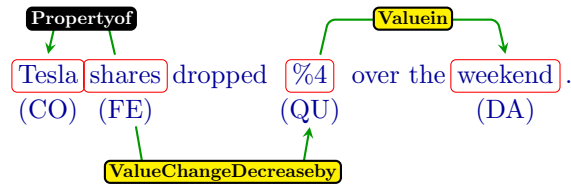


## Relation 8: Propertyof

1. *Action* and *Company/Person*: An *Action* entity is always linked to the *Company* receiving the *Action* through a *Propertyof* relation. In the case of a “merger”, the “merger” *Action* is linked to both *Companies* involved using the *Propertyof* relation.

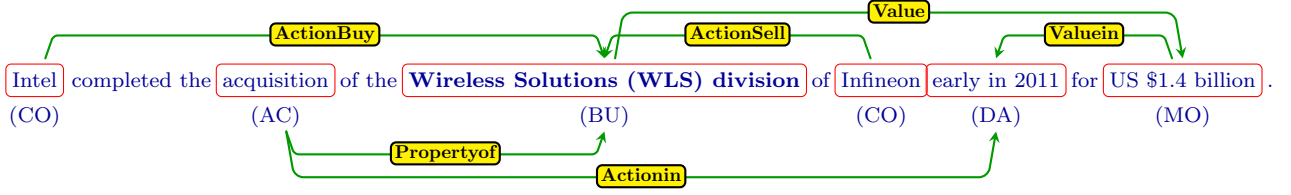


2. *BusinessUnit/FinancialEntity* and *Company*: A *BusinessUnit* is always linked to its owner *Company* through the *Propertyof* relation. One exception is mentioned in the next point (Transferring ownership). Similarly, a *FinancialEntity* is linked to its corresponding *Company*. Common examples include: “stock/share” of a *Company*, “revenue” of a *Company* and “ownership interest” of a *Company*.

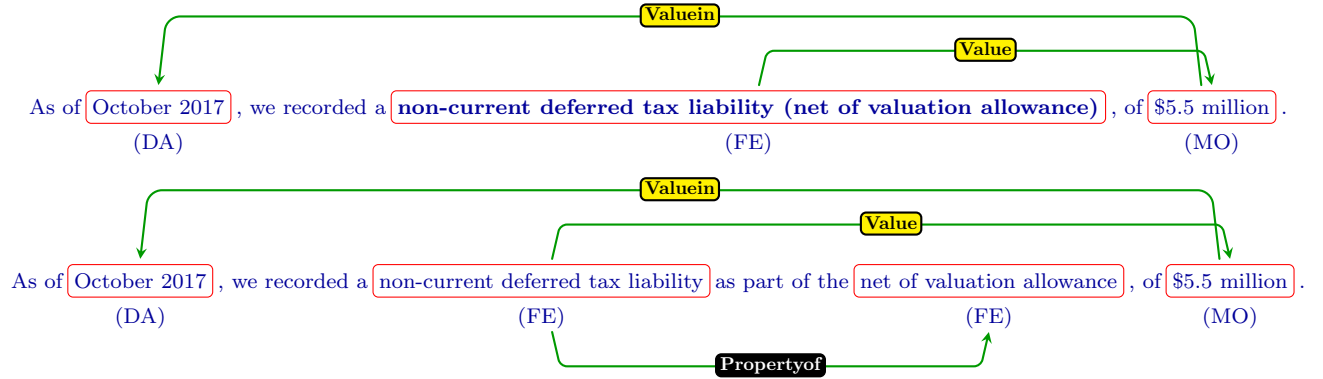


3. *Transferring Ownership: BusinessUnit* and *Company*: A *BusinessUnit* is usually linked to a *Company* through the *Propertyof* relation. The exception is when the *BusinessUnit* is being sold by its parent *Company*. In this case, an

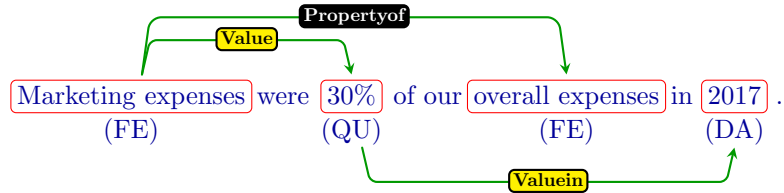
*ActionSell* relation should be labeled between the *BusinessUnit* and the parent *Company*. No *Propertyof* relation is added, neither to the buying *Company* nor to the selling *Company*.



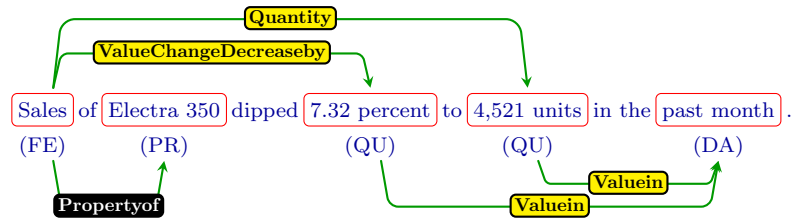
4. *Breaking up a long FinancialEntity*: Following rule 5 from the genral rules (Elliptical pattern, conjunctions and prepositions): It is very common to encounter a very long sequence of a *FinancialEntity*. If the annotator can reasonably spot two separate *FinancialEntities* in this long phrase, the phrase can be broken up into two pieces and linked together through a *Propertyof* relation. Typical keywords that help spot this divide are “entity1 is related to entity2”, “entity1 is a part of entity2” and so on. Below we show two examples. In the first example, the *FinancialEntity* cannot be broken because the whole phrase is describing one concept. On the other hand, the second example clearly distinguishes between the two entities, by describing one being part of the other. In this case, the phrase is broken into two *FinancialEntities* that are linked together using a *Propertyof* relation.



5. *FinancialEntity part of another FinancialEntity*: A very common pattern is as follows: “[FinancialEntity1] comprised x% of [FinancialEntity2]”. In this case two relations are to be annotated: “[FinancialEntity1]” has a *Value* relation of “x%” and “[FinancialEntity1]” is *Propertyof* “[FinancialEntity2]”



6. *FinancialEntity and Product*: A very common pattern is to describe the [sales/revenue/etc.] from a *Product*. In this case, the *FinancialEntity* is linked to the *Product* though a *Propertyof* relation.

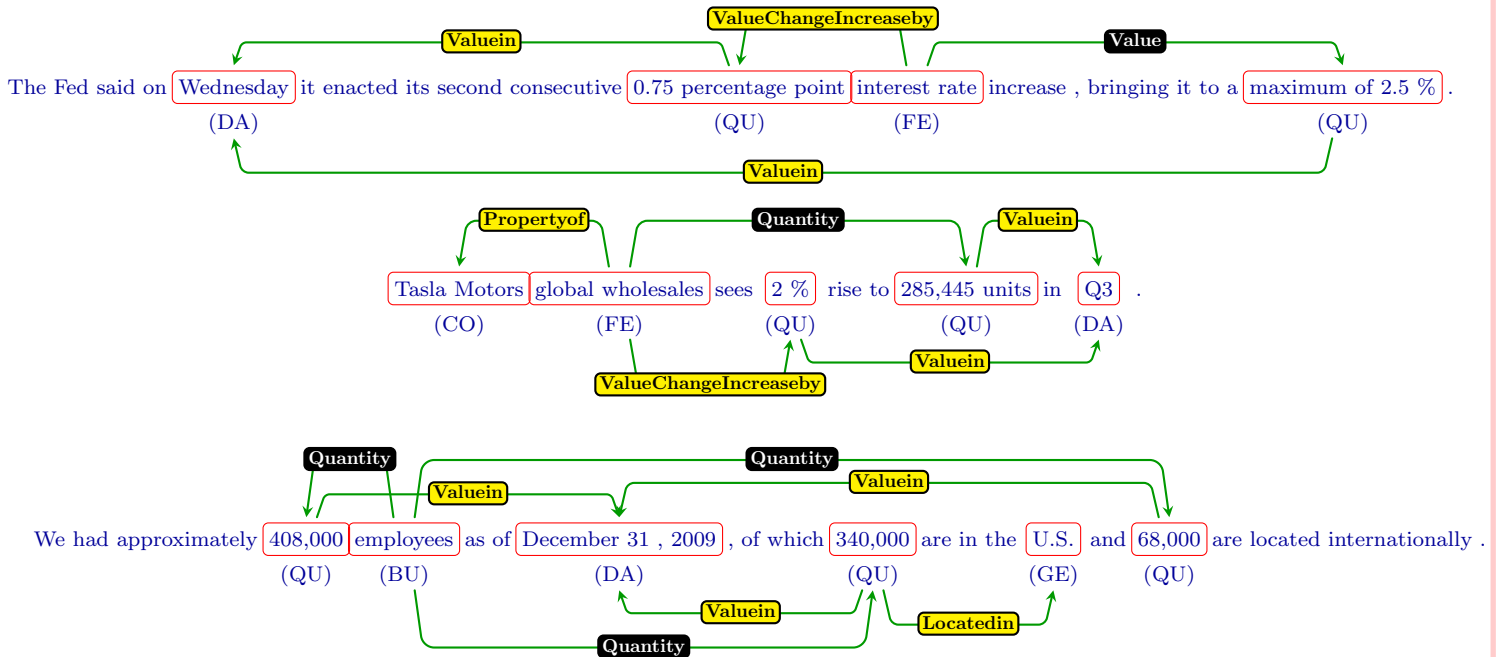


7. General “Price” of a *FinancialEntity*: Refer to item 3 in Entity box 6 (*FinancialEntity*)



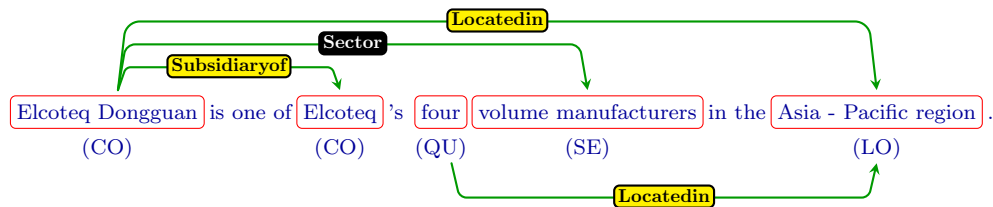
## Relation 9: Quantity

- Do not confuse the *Quantity* entity (a countable or non-countable numeric) with this *Quantity* relation (only **countable** quantity of an entity)
- Countable vs non-countable *Quantity* entities: A *Quantity* entity can be a countable value (e.g. number of shares) or a non-countable value (e.g. percentage, interest rate). Countable entities take the *Quantity* relation while non-countable entities take the *Value* relation. Notice in the first example below, despite “maximum of 2.5%” being a *Quantity* entity, it is used in a *Value* relation, not a *Quantity* relation. The other two examples showcase typical usage of the *Quantity* relation.



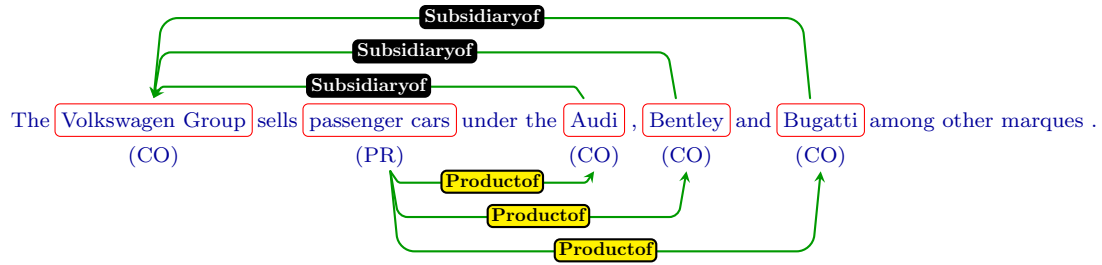
## Relation 10: Sector

- Sector of subsidiaries: If the *Sector* of a subsidiary is mentioned, **do not** add a *Sector* relation for the parent *Company*. This would be deduced from the *Subsidiaryof* relation.

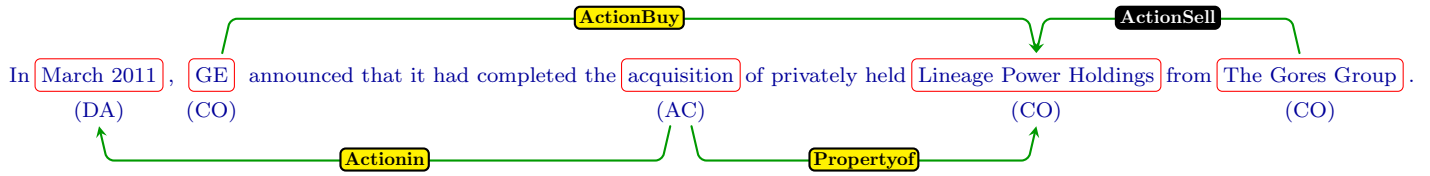


## Relation 11: Subsidiaryof

- Brands of a company should be labeled as separate companies and then the *Subsidiaryof* relation is added to the parent company

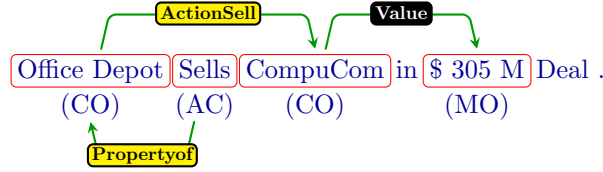


2. Transferring Ownership: *Subsidiaryof* and *ActionBuy/ActionSell*: A *Company* is usually linked to its parent *Company* through the *Subsidiaryof* relation. The exception is when the *Company* is being sold by its parent *Company*. In this case, an *ActionSell* relation should be labeled between the *Company* and the parent *Company*. **No** *Subsidiaryof* relation is added, neither to the buying *Company* nor to the selling *Company*.

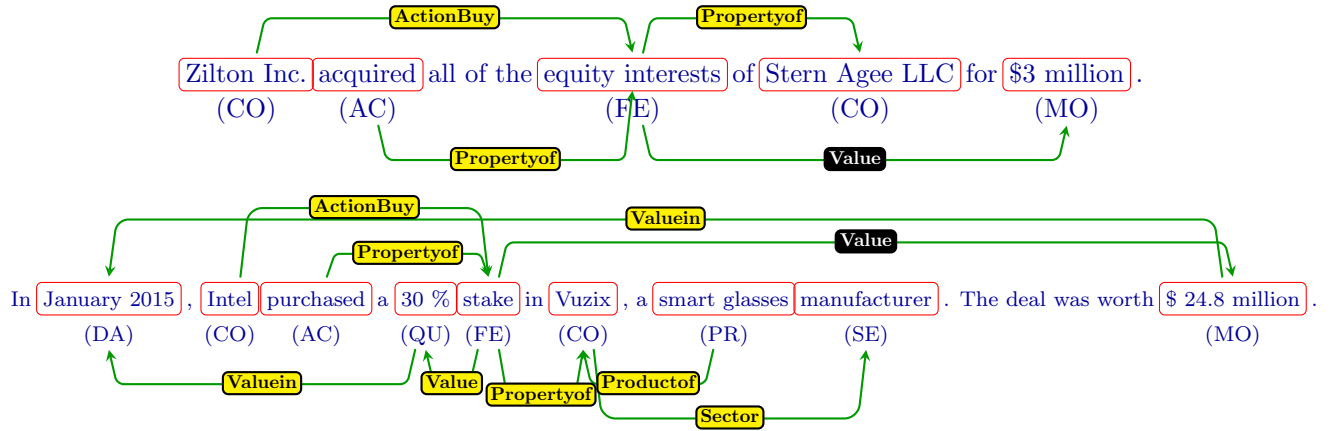


## Relation 12: Value

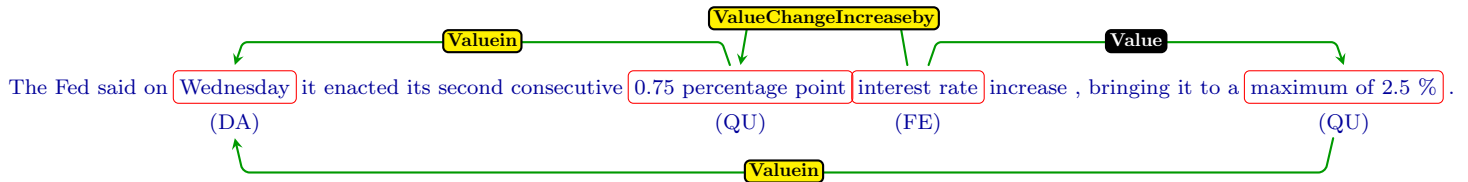
1. *Value* and *ActionBuy/ActionSell*: When an *ActionBuy/ActionSell* relation is present, and the monetary value of the sale is present as well, the head entity of the *Value* relation should be the *Company* or *FinancialEntity* being bought/sold.



2. Intermediate *FinancialEntity*: A very common pattern is as follows: "Company A acquired [shares/equity/stake] of Company B for Money". In the case where this does not indicate that a *Company* acquired ther other *Company* (got at least a majority stake) then the *Value* relation is between the *FinancialEntity* ([shares/equity/stake]) and the *Money* entity.



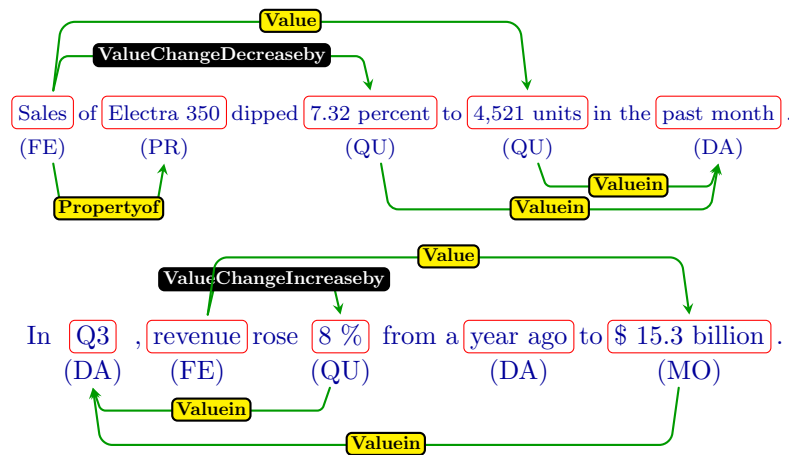
3. Countable vs non-countable *Quantity* entities: A *Quantity* entity can be a countable value (e.g. number of shares) or a non-countable value (e.g. percentage, interest rate). Countable entities take the *Quantity* relation while non-countable entities take the *Value* relation. Refer to item 2 in relation box 9 (*Quantity*) for more examples.



- General “Price” of a *FinancialEntity*: “The **average price** of the Company’s **shares** is \$5” then “average price” takes a *Value* relation of “\$5” and “average price” takes a *Propertyof* relation with “shares”. For more details, refer to item 3 in entity box 6 (*FinancialEntity*).

### Relation 13: ValueChangeDecreaseby

- Money* entities, as well as *Quantity* entities (whether countable or non-countable), can take a *ValueChangeIncreaseby* or a *ValueChangeDecreaseby* relation.

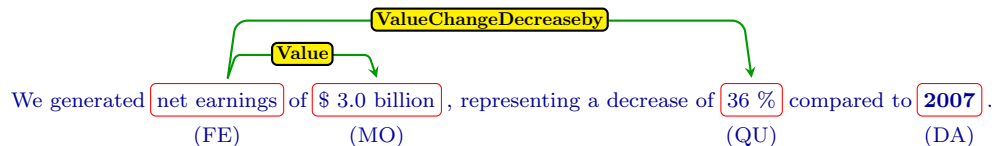


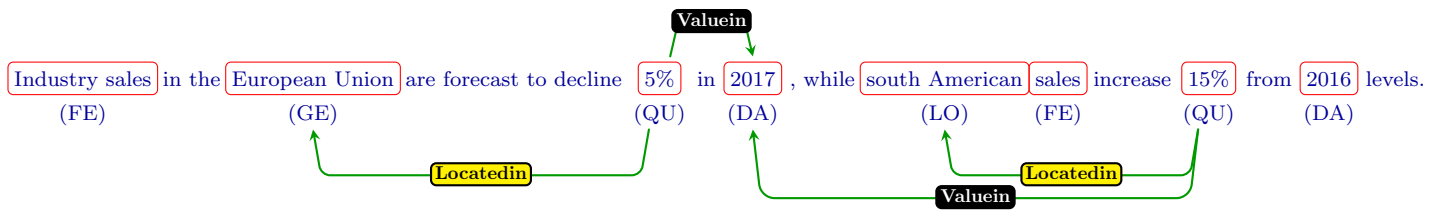
### Relation 14: ValueChangeIncreaseby

- Check relation box 13 (*ValueChangeDecreaseby*)

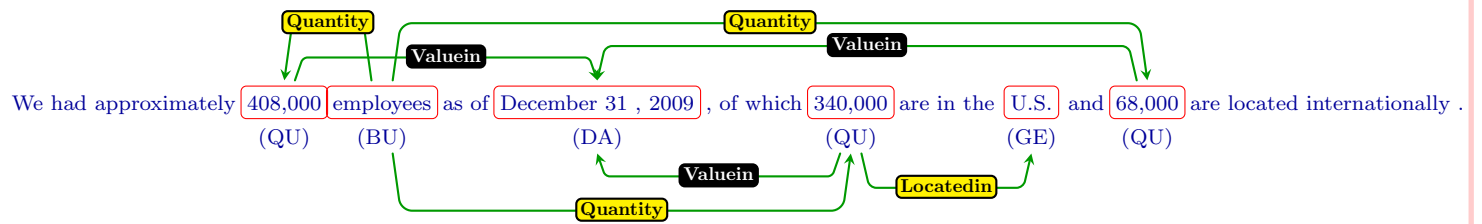
### Relation 15: Valuein

- Year comparisons: When a *Money* or a *Quantity* entity is being compared against an old *Date*, the *Valuein* relation doesn’t hold with the old *Date*, only with the current *Date* (if mentioned). Notice in the example below how the decrease of net earning is “36% compared to 2007” but not in “2007”. The date the decrease happened is not mentioned in the sentence so there is no *Valuein* relation. The same pattern occurs again in the second example with “2016”.





2. *Quantity* entities (whether countable or non-countable), as *Money* entities, always take a *Valuein* relation if a *Date* is present.



## 6 General Rules

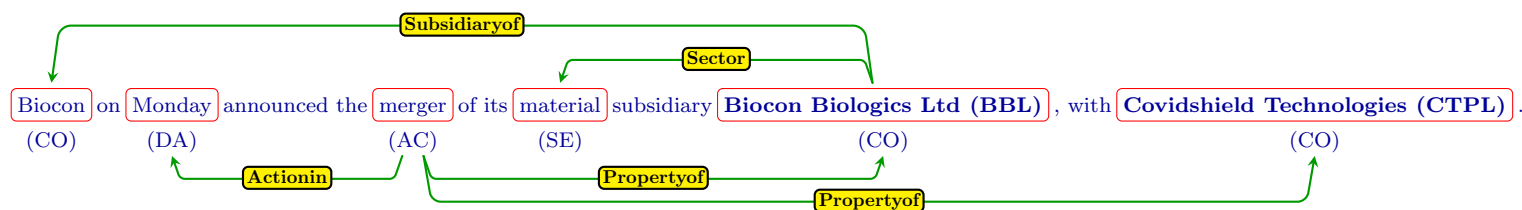
Below we list some general rules and best practices which do not apply to a specific relation or entity class. We follow some of the rules listed in [ACL RD-TEC Annotation Guideline](#)

### 1. Determiners (Following the ACL RD-TEC Annotation Guideline)

- Do not annotate determiners (e.g. “the”, “a”, “every”, etc.) or pronouns e.g. “the **net income** in ...”, unless it is part of the name, usually will be capitalized, e.g. “**The Bank of New York**”

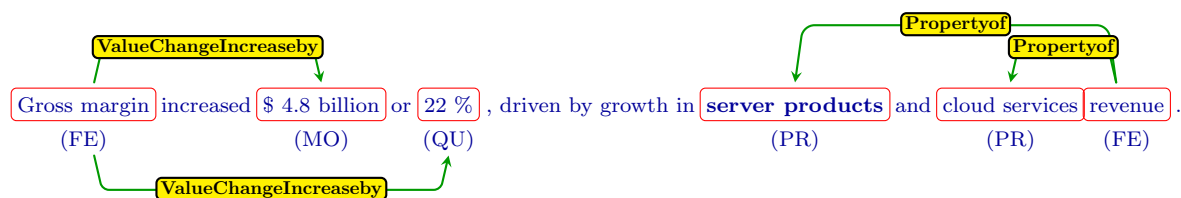
### 2. Term-abbreviation sequence (Following the ACL RD-TEC Annotation Guideline)

- In the case that a term is followed by its abbreviation, the whole sequence is annotated as one term, e.g. “**University of Southern California (USC)**”



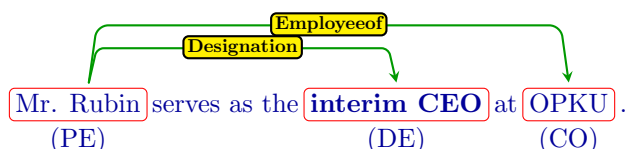
### 3. Maximal Length Annotation Principle (Following the ACL RD-TEC Annotation Guideline)

- We will mostly follow a greedy approach, i.e., label everything to the right of the entity as long as it is still describing the same concept.
- Generic nouns: Terms can be accompanied by generic nouns, e.g., the word “business” in the *Sector* entity “Tech business”. Although it can be argued that “business” is a generic noun and the entity is “Tech”, for a number of considerations annotators are asked to mark “Tech business” as the entity. The added noun does not need to bring additional meaning or information to the entity.
- Notice in the example below how “server products” as a phrase is labeled as a *Product*, although the term “products” doesn’t really add a new meaning to the entity.



### 4. Adjectival modifiers (Following the ACL RD-TEC Annotation Guideline)

- Contrary to the previous rule, adjective modifiers (modifiers to the left of an entity) are not always annotated as part of the entity. Only when an adjective adds meaning to the entity should it be labeled.
- Positive Example: Take an example the phrase: “low-interest loan”. The *FinancialEntity* is the word “loan” but since “low-interest” adds meaning by specifying the type of “loan”, the whole phrase is labeled as the *FinancialEntity*. Another example is provided below. “Interim” adds meaning to the *Designation* entity “CEO”.

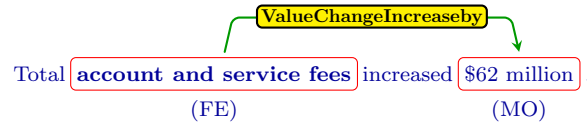
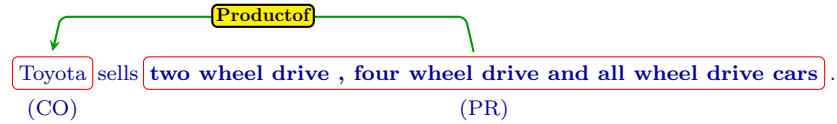


- Negative Example: Consider the example below and specifically the *Sector* entity. We know that the actual *Sector* of the *Company* is “public accounting”. According to rule 3 (Maximal Length Annotation Principle), the word “firm” should be added to the entity. Now regarding the adjective phrase “independent registered”, since this doesn’t add meaning to the *Sector* of the *Company*, rather it gives a fact regarding the *Company*’s registration, it should not be labeled.

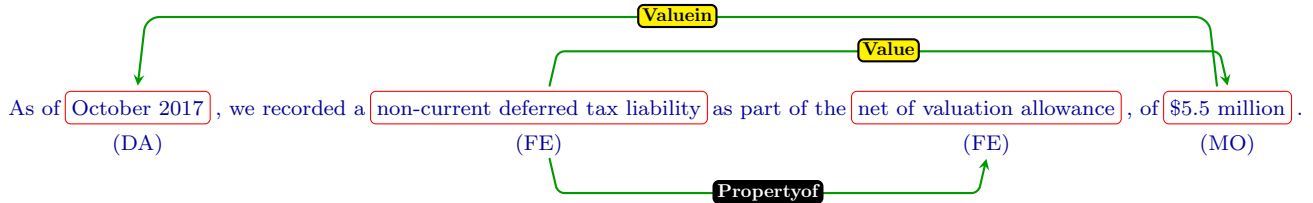
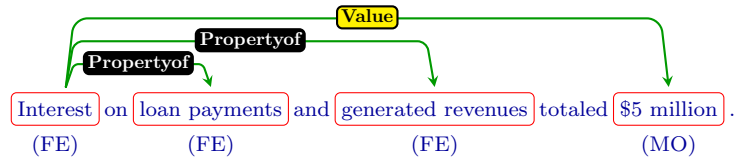


## 5. Elliptical pattern, conjunctions and prepositions (Following the ACL RD-TEC Annotation Guideline)

- For conjunctions, if the noun phrases linked by them are ellipses, the whole span should be annotated as one. For example, in “two-wheel drive, four-wheel drive and all-wheel drive cars”, where we can also read “two-wheel drive cars, four-wheel drive cars and all-wheel drive cars”, the whole term is annotated as one *Product* entity. Otherwise, split the string at the conjunction and annotate the conjuncts separately.



- Complex phrases containing prepositions can normally be split at those points where the prepositions are placed. Thus, for the text snippet “interest on loan payments and generated revenues”, “interest”, “loan payments” and “revenues” are annotated as separate terms.



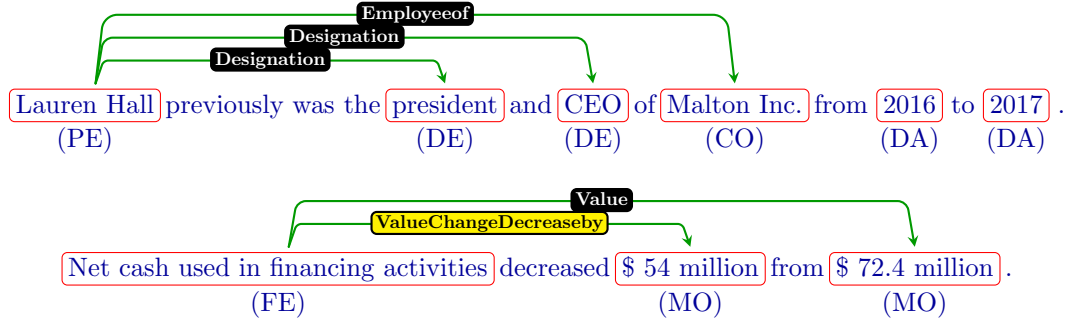
## 6. Nested/Overlap Entities

- There is no general rule to apply when dealing with entity overlap between different entity types. The annotator needs to decide on a case-by-case basis and depending on the type of entities involved. Generally speaking, it is encouraged to avoid overlapping entity labeling, either by annotating the whole phrase as one entity or separating into two entities then using the *Propertyof* relation to link them. Listed below are some the common patterns which already has been discussed in this document.

- Overlap *Company* & *GeopoliticalEntity/Location*: Refer to item 2 in entity box 3 (*Company*)
- Overlap *FinancialEntity* & *Product*: Refer to item 4 in entity box 6 (*FinancialEntity*)
- Overlap *FinancialEntity* & *GeopoliticalEntity/Location*: Refer to item 2 in entity box 7 (*GeopoliticalEntity*)
- Overlap *Sector* & *Company*: Refer to item 5 in entity box 11 (*Product*)
- Overlap *Sector* & *Product*: Refer to item 6 in entity box 11 (*Product*)

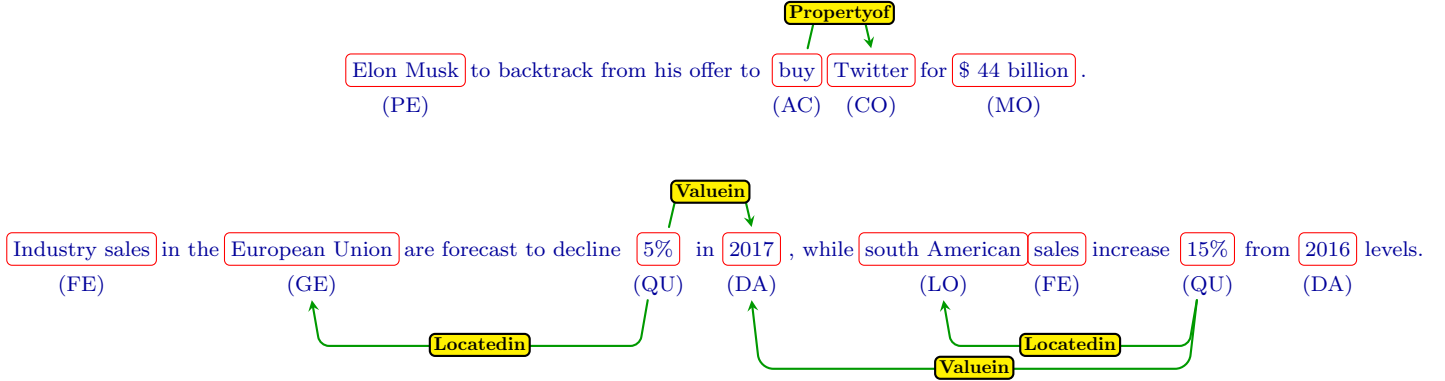
## 7. Past Relations

- Relations that occurred in the past are to be annotated in the same way as relations that occurred in the present.

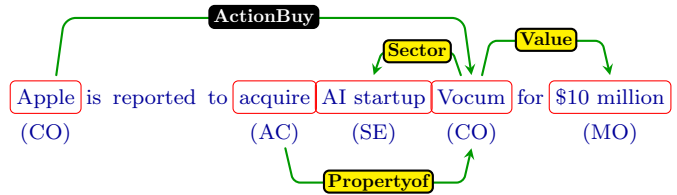


## 8. Hypothetical Events/Negative Relations

- If an event did not happen, i.e. the sentence implies the event was cancelled/declined or the event is hypothetical, i.e. might or might not happen, then the associated relations with this event should not be labeled. Note in the example below, there is no *ActionBuy* or *Value* relation. In the second example, notice that there is no *ValueChangeIncreaseby*/*ValueChangeDecreaseby* relation.



- Note: A reported event or estimated amount is not treated as the other hypothetical events and should be labeled. As a rule of thumb, phrases of the form “If ... then ... ” are what we consider hypothetical events.



## 9. Repeated Occurrence of Relations



- When an entity is repeated in a sentence, all instances of this entity should be labeled and considered for any relation, even if the relation will be repeated as well.
- Notice in the example below, even though “Lauren Hall” is already labeled as being an *Employeeof* “Malton Inc.”, the second sentence, “Malton Inc.” is mentioned again and another *Designation* of “Lauren Hall” is added at the *Company*. Therefore, the annotator has to add an additional *Employeeof* relation due to the information in the second sentence.

