# Guidelines for Temporal Expression Annotation for English for TempEval 2010

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## 1 Introduction

This document describes the annotation guidelines employed for annotating TIMEX instances in the English dataset of the TempEval 2010 evaluation, one of the tasks in the SemEval International Workshop on Semantic Evaluations.[1] This annotation process uses the TimeML language.

TIMEX stands for 'TIME EXpression', and this tag is used to mark temporal expressions such as *4:00 pm*, *October*, and *last week*. The TIMEX tag for TempEval 2010 is called TIMEX3. Early annotation schemes for temporal expressions include TIMEX and TIMEX2. TimeML's TIMEX3 was developed with these earlier schemes in mind, but there are some significant changes. The interested reader can refer to earlier versions of the TimeML guidelines on www.timeml.org for discussions on how TIMEX3 is different. For these guidelines, though, we will only speak to the current TIMEX3 specification with as few references to other temporal expression annotations as possible.

Like the annotation process for events, the TIMEX3 annotation process will be split into two subtasks. First, TIMEX3 extents will be identified within the text, and, once that is completed, the attributes for each TIMEX3 will be characterized. The structure of the present document reflects this division: Section **??** addresses how to identify TIMEX3 **extents**, and section **??** focuses on the task of annotating TIMEX3 **attributes**.

[1] http://nlp.cs.swarthmore.edu/semeval/tasks/index.php

## 2 TIMEX3 Extents

This section addresses what to mark as the span, or extent, of the TIMEX3 tag.

In terms of the type of word or phrase which is marked as a TIMEX3, the full extent of the tag must be one of the following grammatical categories:

1. Noun (including Proper Nouns): e.g. *today*, *Thursday*
2. Noun Phrase (NP): e.g. *the morning*, *Friday night*, *the last two years*
3. Adjective: e.g. *current*
4. Adverb: e.g. *recently*
5. Adjective or Adverb Phrase: e.g. *half an hour long*, *two weeks ago*, *nearly a half-hour*

The full extent of a TIMEX3 cannot be a Prepositional Phrase (so that the extent begins with a Preposition) or a clause of any type (for example, the expression cannot start with a subordinating conjunction). Thus, the following are not allowed as TIMEX3 extents: *before Thursday*, *in the morning*, *after the strike ended on Thursday*, *over the last 2 years*. Note though that each of these expressions do include TIMEX3 extents that should be marked: *before* **Thursday**, *in* **the morning**, *after the strike ended on* **Thursday**, *over* **the last 2 years**.

In terms of its syntactic structure, the full extent of a TIMEX3 should include premodifiers of the time expression (including Determiners), those premodifiers that qualify as MOD attributes, and also premodifiers with no corresponding MOD token. So, for instance, all of the following represent markable TIMEX3s: *that cold day*, *the next day*, *late last night*, *next summer*, *recent decades*, *numerous Saturdays*, *more than a month*, *no less than 60 days*, and *just a year ago*.

The full extent of a TIMEX3 should not include postmodifiers of the time expression, including Prepositional Phrases and dependent clauses. For example, the following are not full extents for TIMEX3, though they do each include markable TIMEX3s, highlighted in bold: **five days** *after he came back*, **the future** *of our peoples*, **nearly four decades** *of experience*, and **months** *of renewed hostility*.

As a general rule, the extent of a TIMEX3 should be as small as possible. This is the main difference between TIMEX3 and earlier TIMEX versions. Whereas TIMEX and TIMEX2 would include these postmodifiers as part

of the temporal expression, in TimeML, this additional information is captured by other tags in the annotation such as EVENT and TLINK. This is especially important to keep in mind for more complex temporal expressions as detailed below.

1. **ONE TIMEX3 tag** will be used when there is no intervening token between temporal terms that express values for a single mention of time as in *twelve o'clock midnight* or where values for units are hierarchically related as in *Friday evening*. The following examples are all single TIMEX3 tags:

   *twelve o'clock midnight*
   *Friday evening*
   *8:00 p.m. Friday*
   *Tuesday the 18th*
   *November 1943*
   *Fall 1998*
   *this year's summer*

2. **ONE TIMEX3 tag** will be used when certain prepositions appear within temporal expressions. The best way to identify these special cases is to think about whether the expression can easily be represented as a single temporal value as in the following cases:

   *the second of December*
   *summer of 1965*
   *ten of two*
   *ten minutes to three*
   *half past noon*
   *eleven in the morning*

3. **TWO TIMEX3 tags** with no nesting of tags inside one another will be used in the following situations:

   (a) Sequences of two temporal expressions that are ordered one relative to the other. They generally involve the use of temporal prepositions and conjunctions like *from, before, after, following, prior to*, etc.

   *I'm leaving on vacation [two weeks] from [next Tuesday].*
   *John left [2 days] before [yesterday].*

These expressions are referred to as **anchored durations** and are addressed further in the next section on attributes.

(b) Sequences of two temporal expressions that can be related by a temporal link:

*I tutored an English student [some Thursdays] in [1998].*
*The concert is at [8:00 p.m.] on [Friday].*
*The concert is [Friday] at [8:00 p.m.]*

Finally, while postmodifiers that introduce a related event are never included in the TIMEX3 extent, adverbial postmodifiers are included in the TIMEX3 extent as in:

*the best second quarter ever*
*three years ago*

Each of these examples are treated as single TIMEX3 tags.

Special attention needs to be given to range expressions such as *from 1992 through 1995* and *August 6-8*. Since these expressions contain calendar information that cannot be fully represented with one TIMEX3, they are annotated as **TWO TIMEX3 tags**, the extent of which does not include any temporal signals. The two TIMEX3 tags that are created for *from 1992 through 1995* are *[1992]* and *[1995]*. For *August 6-8*, the extents are *[August 6]* and *[8]*. The temporal signals such as *from, through* and even the dash in the latter example would be marked with the SIGNAL tag in a complete TimeML annotation. A non-consuming TIMEX3 (one that does not refer to any explicit text) is then added to capture the duration that such range expressions introduce. A similar treatment is used for anchored durations. Both kinds of expression are further explained in the next section.

The next section on the TIMEX3 attributes includes many more examples of TIMEX3 extents, so we recommend you read through the entire document before beginning the TIMEX3 extent task.

# 3 TIMEX3 Attributes

We now describe each of the TIMEX3 attributes. Some of these are automatically assigned by the annotation tool while others are not being used for TempEval 2010. This is noted where applicable.

**a. Timex ID number (tid)** Non-optional attribute. Each `TIMEX3` expression has to be identified by a unique ID number. This is automatically assigned by the annotation tool.

**b. Type** Non-optional attribute. Each `TIMEX3` is assigned one of the following types: `DATE`, `TIME`, `DURATION`, or `SET`. The format of the `value` attribute is determined by the `type` of `TIMEX3`. For instance, a `DURATION` must have a `value` that begins with the letter 'P' since durations represent a period of time. This will be elaborated on below in the `value` section. In addition, some optional attributes are used specifically with certain types of temporal expressions.

The following examples illustrate each possible `type` value. In them, the `TIMEX3` markable expression is in bold face:

- `DATE`: The expression describes a calendar time.

  *Mr. Smith left* **Friday, October 1, 1999**
  **the second of December**
  **yesterday**
  *in* **October of 1963**
  *in* **the summer of 1964**
  *on* **Tuesday 18th**
  *in* **November 1943**
  **this year's summer**
  **two weeks from next Tuesday**
  **last week**

- `TIME`: The expression refers to a time of the day, even if in a very indefinite way (as in the two last examples below):

  *Mr. Smith left* **ten minutes to three**
  *at* **five to eight**
  *at* **twenty after twelve**
  *at* **half past noon**
  *at* **eleven in the morning**
  *at* **9 a.m. Friday, October 1, 1999**
  **the morning of January 31**
  **late last night**
  **last night**

- `DURATION`: The expression describes a duration. This value is assigned to explicit durations like the following:

  *Mr. Smith stayed* **2 months** *in Boston*

**48 hours**
**three weeks**
**all last night**
**20 days** *in July*
**3 hours** *last Monday.*

As a rule, if any specific calendar information is supplied in the temporal expression, then the `type` of the `TIMEX3` must be either `DATE` or `TIME`. Some annotators may be tempted to make something like *1985* a `DURATION` if the context suggests that an event holds throughout that year. However, since it is required that a `DURATION` have a particular format in the `value` attribute, such a temporal expression as the one described here must be a `DATE`.

- `SET`: The expression describes a set of times. For example:

  *John swims* **twice a week**.
  **every 2 days**.

**c. Value** The `value` attribute details what temporal information is contained in the TIMEX3. This value is given in an extended ISO 8601 format. The following examples, from previous sections, partially illustrate the use of the `value` attribute for times of the day, dates, durations, and sets. Note though that these examples may not cover every possible temporal expression you may come across. If you are uncertain of the format of a particular TIMEX3 `value`, please refer to the TIDES guidelines for TIMEX2, available at

`http://timeml.org/site/terqas/readings/MTRAnnotationGuide_1_2.pdf`

These examples are shown in the way that a TimeML annotation is outputted in XML. The value is given in quotation marks after the words "value=".

- Times of the day, and dates:

```
<TIMEX3 tid="t1" type="TIME" value="T24:00">
twelve o'clock midnight
</TIMEX3>
```

In case the text would include some reference to the specific date in which the time is anchored (e.g., *Last Friday's party didn't start till twelve o'clock midnight*, assuming that today is Friday, July 12, 2002), then the `value` attribute must also contain the date, and be: `value="2002-07-05T24:00"`. The annotator should fill in as much information in the `value` attribute as possible, as well as provide the `tid` for the temporal expression it is anchored to. This information is supplied in the `anchorTimeID` attribute.

```
<TIMEX3 tid="t2" type="TIME" value="T11">
eleven in the morning
</TIMEX3>
```

The same comment as above applies here.

```
<TIMEX3 tid="t3" type="TIME" value="2001-01-12TEV">
Friday evening
</TIMEX3>
```

The value in the above example assumes that we know that the document creation time is Tuesday, January 8th, 2001.

```
<TIMEX3 tid="t4" type="TIME" value="1984-01-03T12:00">
twelve o'clock January 3, 1984
</TIMEX3>
```

We assume here that noon is intended.

```
<TIMEX3 tid="t5" type="DATE" value="XXXX-12-02">
the second of December
</TIMEX3>
```

Unless we know the year to which the text is anchoring the current temporal expression, the `value` attribute will leave the year underspecified by means of placeholders: `XXXX`.

```
<TIMEX3 tid="t6" type="DATE" value="1964-SU">
summer of 1964
</TIMEX3>
```

- Durations:

```
<TIMEX3 tid="t1" type="DURATION" value="P4M">
4 months
</TIMEX3>

for
<TIMEX3 tid="t1" type="DURATION" value="PT20M">
20 minutes
</TIMEX3>
<TIMEX3 tid="t2" type="DATE" value="XXXX-07-08">
last Monday
</TIMEX3>

during
<TIMEX3 tid="t1" type="DURATION" value="P2D">
two entire days
</TIMEX3>
of
<TIMEX3 tid="t2" type="DATE" value="1999-SU">
the summer of 1999
</TIMEX3>
```

The following two examples introduce a duration, but they must first be annotated as times or dates so that the specific calendar information they contain can be included. Such durations make use of an empty content TIMEX3 as well as the `beginPoint` and `endPoint` attributes. Here, we provide only the `type` and `value` attributes, but we will return to these examples in the discussion of these additional attributes below.

```
He left between
<TIMEX3 tid="t1" type="TIME" value="T18:00">
6:00 p.m.
</TIMEX3>
and
<TIMEX3 tid="t2" type="TIME" value="T20:00">
8:00 p.m.
```

```
</TIMEX3>
<TIMEX3 tid="t3" type="DURATION" value="P2H"/>

We'll be on a break from
<TIMEX3 tid="t1" type="DATE" value="XXXX-07-01">
July, 1
</TIMEX3>
to
<TIMEX3 tid="t2" type="DATE" value="XXXX-08-15">
August, 15
</TIMEX3>
<TIMEX3 tid="t3" type="DURATION" value="P46D"/>
```

- Sets:

  To fully annotate sets, the `TIMEX3` must also include either the `quant` or `freq` attributes, if not both. The following examples begin the annotation of a `TIMEX3` `set` as pertains to the value attribute:

```
<TIMEX3 tid="t1" type="SET" value="P1W">
twice a week
</TIMEX3>

<TIMEX3 tid="t1" type="SET" value="P2D">
every 2 days
</TIMEX3>

<TIMEX3 tid="t1" type="SET" value="P1W">
3 days each week
</TIMEX3>

<TIMEX3 tid="t1" type="SET" value="XXXX-10">
every October
</TIMEX>
```

  Notice that in the last example, the value looks more like that of a `DATE` than a `DURATION`. This is so we can capture the calendar information that is present in the temporal expression. Some annotators may find it confusing as to when a DATE-like annotation is used and when a

| | Value | Sample Expressions |
|---|---|---|
| Points | BEFORE | *more than a decade ago* |
| | AFTER | *less than a year ago* |
| | ON_OR_BEFORE | *no less than a year ago* |
| | ON_OR_AFTER | *no more than a year ago* |
| Durations | LESS_THAN | *less than 2 hours long* |
| | MORE_THAN | *more than 5 minutes* |
| | EQUAL_OR_LESS | *no more than 10 days* |
| | EQUAL_OR_MORE | *at least 10 days* |
| Points and Durations | START | *the early 1960s, the dawn of 2000* |
| | MID | *the middle of the month, mid-February* |
| | END | *the end of the year* |
| | APPROX | *about three years ago* |

Table 1: Values for MOD attribute

DURATION-like format is preferred. In general, if there is no specified calendar date (for example, "October" or "Tuesday"), then the value for the `SET` will be like that of a `DURATION`.

**d. mod** Optional attribute, inherited directly from the TIMEX2 MOD attribute. Table **??** shows the possible values for this attribute along with examples of when to use them.

**e. temporalFunction** Binary attribute which expresses that the value of the temporal expression needs to be determined via evaluation of a temporal function.

The value for this attribute will be positive for those cases that do not contain all the information necessary to fill the higher-order (left-hand) positions in the date value. Some examples are:

*eleven in the morning*
*January, 31*
*late last night*
*last week*

Note that even if the `value` attribute has been completely filled because the context provides the necessary information, the `temporalFunction` attribute should still receive a positive value so that the pertinent temporal

function in T3PO can be tested to see if it can reproduce the value that the human annotator has assigned.

On the other hand, for cases in which the higher-order position of the value are filled `temporalFunction` should be assigned a negative value. Such cases include:

*twelve o'clock January 3, 1984*
*summer of 1964*
*Friday, October 1, 1999*
*9 a.m. Friday, October 1, 1999*
*the morning of January 31, 1999*

Durations will receive `true` as the value of the `temporalFunction` attribute, in the case of underspecification. Examples of expressions that will be assigned `true` for this attribute are the following, where the scope of the `TIMEX3` tag is in bold face:

*in* **recent months**
*during* **the following hours**

On the other hand, expressions of durations that will be assigned `false` as value of the `temporalFunction` attribute are:

for **two months**
**48 hours**

By default, the value introduced in `temporalFunction` will be positive, given that specific expressions like those immediately above seem to appear rarely in the corpora.

This attribute will not be used for TempEval 2010. Instead, the presence of an anchor time or the begin and endpoint attributes will suffice to set the temporal function attribute to `true`.

**f. anchorTimeID** Optional attribute. It introduces the ID of the **temporal expression** to which the `TIMEX3` in question is temporally anchored. Its value is then always a timeID. Other temporal relations such as the one between the event *left* and the time *Tuesday* in *He left on Tuesday* will be annotated by means of a `TLINK`.

The temporal anchors that are annotatable are those outside the scope of the `TIMEX3` tag, as in the following example.

*Mary left on Thursday and John arrived the day after.*

```
Mary left
on
<TIMEX3 tid="t1" type="DATE"
value="1998-WXX-4" temporalFunction="true"
anchorTimeID="t0">
Thursday
</TIMEX3>
and John arrived
<TIMEX3 tid="t2" type="DATE"
value="1998-WXX-5" temporalFunction="true"
anchorTimeID="t1">
the day
</TIMEX3>
after
```

In this case, both TIMEX3 expressions require the application of a temporal function: *the day (after)* needs to be evaluated with respect to *Thursday*, and *Thursday* relative to another time reference, not explicit in the current example. (For these guidelines we use *t0* to represent this extra temporal reference.)

*The TERQAS Workshop will resume July 15, 2002. The session will start at 9:00 a.m.*

```
The TERQAS Workshop will resume
<TIMEX3 tid="t1" type="DATE" value="2002-07-15">
July 15, 2002
</TIMEX3>
. The session will start at
<TIMEX3 tid="t2" type="TIME" value="2002-07-15T9:00"
temporalFunction="true" anchorTimeID="t1">
9:00 a.m.
</TIMEX3>
```

**g. valueFromFunction** Omitted for TempEval 2010.

**h. functionInDocument** Omitted for TempEval 2010.

**i. beginPoint and endPoint** These attributes are used when a duration is anchored by another time expression, as well a for range expressions. If only one of these points is provided in the text, the annotator can create an empty `TIMEX3` to represent the missing point. In some ways, the `beginPoint` and `endPoint` attributes are similar to `anchorTimeID`. The values stored in these attributes can be used by temporal functions to compute the missing point and create a tag for it. The following example shows how this might occur:

```
John begins teaching
<TIMEX3 tid="t1" type="DURATION" value="P1W"
beginPoint="t2" endPoint="t3">
one week
</TIMEX3>
from
<TIMEX3 tid="t2" type="DATE" value="XXXX-9-15">
September 15
</TIMEX3>
<TIMEX3 tid="t3" type="DATE" value="XXXX-9-22"
temporalFunction="TRUE" anchorTimeID="t1" />
```

The new `tid` created by the empty `TIMEX3` can be used to link the teaching event directly to the time at which it takes place using a `TLINK`.

A similar treatment is given to range expressions. The following example completes one from earlier in this document.

```
He left between
<TIMEX3 tid="t1" type="TIME" value="T18:00">
6:00 p.m.
</TIMEX3>
and
<TIMEX3 tid="t2" type="TIME" value="T20:00">
8:00 p.m.
</TIMEX3>
<TIMEX3 tid="t3" type="DURATION" value="P2H"
beginPoint="t1" endPoint="t2"/>
```

**j. quant and freq** These attributes are used when a temporal expression is of the type `SET`. `quant` is generally a literal from the text that quantifies

over the expression. `freq` contains an integer value and a time granularity that represent the frequency at which the temporal expression regularly reoccurs. These attributes are only used if their values are supplied by the temporal expression (or by a temporal anchor). Though it seems on occasion that values for these attributes can be inferred, they will not be for purposes of manual annotation. Although, if there is no specified `quant`, one imagines that the set is universally quantified. The following examples complete the annotations of the sets listed earlier in this section:

```
<TIMEX3 tid="t1" type="SET" value="P1W" freq="2X">
twice a week
</TIMEX3>

<TIMEX3 tid="t1" type="SET" value="P2D" quant="EVERY">
every 2 days
</TIMEX3>

<TIMEX3 tid="t1" type="SET" value="P1W" quant="EACH" freq="3d">
3 days each week
</TIMEX3>

<TIMEX3 tid="t1" type="SET" value="XXXX-10" quant="EVERY">
every October
</TIMEX>
```