year_number : / $\begin{bmatrix} token \\ \text{TYPE} & any_natural_number \\ \text{SURFACE} & \boxed{\text{year}} \end{bmatrix}$
where
StringLength ($\boxed{\text{year}}$, `"eq"`, `"4"`) .

dofw : / $\begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_this_next_last \\ \text{ID} & \boxed{\text{descript}} \end{bmatrix}^{?} \bullet \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_dofw \\ \text{ID} & \boxed{\text{dofw}} \end{bmatrix} \bullet \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_pofd \\ \text{ID} & \boxed{\text{pofd}} \end{bmatrix}^{?}$.

en_dofw :> $\left(\begin{bmatrix} morph \\ \text{POS} & adp \\ \text{SURFACE} & \boxed{\text{prep}} \end{bmatrix}^{?} \bullet \text{@seek(dofw)} \ \& \ \begin{bmatrix} \text{DESCRIPTOR} & \boxed{\text{descript}} \\ \text{PART-OF-DAY} & \boxed{\text{pofd}} \\ \text{DOFW} & \boxed{\text{dofw}} \end{bmatrix} \right) | \left(\begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_early_late \\ \text{ID} & \boxed{\text{descript}} \end{bmatrix} \bullet \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_dofw \\ \text{ID} & \boxed{\text{dofw}} \end{bmatrix} \right) \rightarrow \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{DESCRIPTOR} & \boxed{\text{descript}} \\ \text{PREPOSITIONS} & \langle \boxed{\text{prep}} . *top* \rangle \\ \text{PART-OF-DAY} & \boxed{\text{pofd}} \\ \text{DOFW} & \boxed{\text{dofw}} \end{bmatrix}$.

en_span_dofw :> $\begin{bmatrix} token \\ \text{SURFACE} & \texttt{"from"} \end{bmatrix} \bullet \text{@seek(dofw)} \ \& \ \begin{bmatrix} \text{DESCRIPTOR} & \boxed{\text{descript1}} \\ \text{PART-OF-DAY} & \boxed{\text{pofd1}} \\ \text{DOFW} & \boxed{\text{dofw1}} \end{bmatrix} \bullet \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"to"} \end{bmatrix} | \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"through"} \end{bmatrix} \bullet \text{@seek(dofw)} \ \& \ \begin{bmatrix} \text{DESCRIPTOR} & \boxed{\text{descript2}} \\ \text{PART-OF-DAY} & \boxed{\text{pofd2}} \\ \text{DOFW} & \boxed{\text{dofw2}} \end{bmatrix} \rightarrow \begin{bmatrix} span \\ \text{FROM} & \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{DESCRIPTOR} & \boxed{\text{descript1}} \\ \text{PART-OF-DAY} & \boxed{\text{pofd1}} \\ \text{DOFW} & \boxed{\text{dofw1}} \end{bmatrix} \\ \text{TO} & \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{DESCRIPTOR} & \boxed{\text{descript2}} \\ \text{PART-OF-DAY} & \boxed{\text{pofd2}} \\ \text{DOFW} & \boxed{\text{dofw2}} \end{bmatrix} \end{bmatrix}$.

month : / $\left(\begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_this_next_last \\ \text{ID} & \boxed{\text{descript}} \end{bmatrix} | \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_early_late \\ \text{ID} & \boxed{\text{descript}} \end{bmatrix} \right)^{?} \bullet \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_month_word \\ \text{ID} & \boxed{\text{month}} \end{bmatrix} | \left(\begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_this_next_last \\ \text{ID} & \boxed{\text{month}} \end{bmatrix} \bullet \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"month"} \end{bmatrix} \right) \bullet \left(\boxed{\text{year}} \ \& \ \text{@seek(year_number)} \mid \left(\begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_this_next_last \\ \text{ID} & \boxed{\text{year}} \end{bmatrix} \bullet \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"year"} \end{bmatrix} \right) \right)^{?}$.

en_month :> $\begin{bmatrix} morph \\ \text{POS} & adp \\ \text{SURFACE} & \boxed{\text{prep}} \end{bmatrix}^{?} \bullet \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"earlier"} \\ \text{ID} & \boxed{\text{pofm}}\ begin_of \end{bmatrix}^{?} \bullet \text{@seek(month)} \ \& \ \begin{bmatrix} \text{DESCRIPTOR} & \boxed{\text{descript}} \\ \text{MONTH} & \boxed{\text{month}} \\ \text{YEAR} & \boxed{\text{year}} \end{bmatrix} \rightarrow \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{DESCRIPTOR} & \boxed{\text{descript}} \\ \text{PREPOSITIONS} & \langle \boxed{\text{prep}} . *top* \rangle \\ \text{PART-OF-MONTH} & \boxed{\text{pofm}} \\ \text{YEAR} & \boxed{\text{year}} \\ \text{MONTH} & \boxed{\text{month}} \end{bmatrix}$.

en_span_month :> $\begin{bmatrix} token \\ \text{SURFACE} & \texttt{"from"} \end{bmatrix} \bullet \text{@seek(month)} \ \& \ \begin{bmatrix} \text{DESCRIPTOR} & \boxed{\text{descript1}} \\ \text{MONTH} & \boxed{\text{month1}} \\ \text{YEAR} & \boxed{\text{year1}} \end{bmatrix} \bullet \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"to"} \end{bmatrix} \bullet \text{@seek(month)} \ \& \ \begin{bmatrix} \text{DESCRIPTOR} & \boxed{\text{descript2}} \\ \text{MONTH} & \boxed{\text{month2}} \\ \text{YEAR} & \boxed{\text{year2}} \end{bmatrix} \rightarrow \begin{bmatrix} span \\ \text{FROM} & \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{DESCRIPTOR} & \boxed{\text{descript1}} \\ \text{MONTH} & \boxed{\text{month1}} \\ \text{YEAR} & \boxed{\text{year1}} \end{bmatrix} \\ \text{TO} & \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{DESCRIPTOR} & \boxed{\text{descript2}} \\ \text{MONTH} & \boxed{\text{month2}} \\ \text{YEAR} & \boxed{\text{year2}} \end{bmatrix} \end{bmatrix}$.

en_month_with_part_of_month :> $\begin{bmatrix} morph \\ \text{POS} & adp \\ \text{SURFACE} & \boxed{\text{prep}} \end{bmatrix}^{?} \bullet \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"the"} \end{bmatrix} \bullet \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_begin_middle_end \\ \text{ID} & \boxed{\text{pofm}} \end{bmatrix} \bullet \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"of"} \end{bmatrix} \bullet \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_month_word \\ \text{ID} & \boxed{\text{month}} \end{bmatrix} \rightarrow \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{PREPOSITIONS} & \langle \boxed{\text{prep}} . *top* \rangle \\ \text{PART-OF-MONTH} & \boxed{\text{pofm}} \\ \text{MONTH} & \boxed{\text{month}} \end{bmatrix}$.

dofm : / $\left(\begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_month_word \\ \text{ID} & \boxed{\text{month}} \end{bmatrix} \bullet \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_dofm \\ \text{ID} & \boxed{\text{dofm}} \end{bmatrix} \right) | \left(\begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_dofm \\ \text{ID} & \boxed{\text{dofm}} \end{bmatrix} \bullet \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_month_word \\ \text{ID} & \boxed{\text{month}} \end{bmatrix} \right) | \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_today_tomorrow_yesterday \\ \text{ID} & \boxed{\text{dofm}} \end{bmatrix}$.

en_dofm :> $\begin{bmatrix} morph \\ \text{POS} & adp \\ \text{SURFACE} & \boxed{\text{prep}} \end{bmatrix}^{?} \bullet \left(\text{@seek(dofw)} \ \& \ \begin{bmatrix} \text{DESCRIPTOR} & \boxed{\text{descript}} \\ \text{PART-OF-DAY} & \boxed{\text{pofd}} \\ \text{DOFW} & \boxed{\text{dofw}} \end{bmatrix} \bullet \begin{bmatrix} token \\ \text{TYPE} & comma \end{bmatrix}^{?} \right)^{?} \bullet \text{@seek(dofm)} \ \& \ \begin{bmatrix} \text{MONTH} & \boxed{\text{month}} \\ \text{DOFM} & \boxed{\text{dofm}} \end{bmatrix} \bullet \begin{bmatrix} token \\ \text{TYPE} & comma \end{bmatrix}^{?} \bullet \boxed{\text{year}} \ \& \ \text{@seek(year_number)}^{?} \rightarrow \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{DESCRIPTOR} & \boxed{\text{descript}} \\ \text{PREPOSITIONS} & \langle \boxed{\text{prep}} . *top* \rangle \\ \text{PART-OF-DAY} & \boxed{\text{pofd}} \\ \text{DOFW} & \boxed{\text{dofw}} \\ \text{YEAR} & \boxed{\text{year}} \\ \text{MONTH} & \boxed{\text{month}} \\ \text{DOFM} & \boxed{\text{dofm}} \end{bmatrix}$.

en_span_dofm :> $\begin{bmatrix} token \\ \text{SURFACE} & \texttt{"from"} \end{bmatrix} \bullet \text{@seek(en_dofm)} \ \& \ \begin{bmatrix} \text{YEAR} & \boxed{\text{year1}} \\ \text{MONTH} & \boxed{\text{month1}} \\ \text{DOFM} & \boxed{\text{dofm1}} \end{bmatrix} \bullet \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"to"} \end{bmatrix} | \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"until"} \end{bmatrix} \bullet \text{@seek(en_dofm)} \ \& \ \begin{bmatrix} \text{YEAR} & \boxed{\text{year2}} \\ \text{MONTH} & \boxed{\text{month2}} \\ \text{DOFM} & \boxed{\text{dofm2}} \end{bmatrix} \rightarrow \begin{bmatrix} span \\ \text{FROM} & \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{YEAR} & \boxed{\text{year1}} \\ \text{MONTH} & \boxed{\text{month1}} \\ \text{DOFM} & \boxed{\text{dofm1}} \end{bmatrix} \\ \text{TO} & \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{YEAR} & \boxed{\text{year2}} \\ \text{MONTH} & \boxed{\text{month2}} \\ \text{DOFM} & \boxed{\text{dofm2}} \end{bmatrix} \end{bmatrix}$.

en_year :> $\left(\begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_early_late \\ \text{ID} & \boxed{\text{descript}} \end{bmatrix}^{?} \bullet \begin{bmatrix} morph \\ \text{POS} & adp \\ \text{SURFACE} & \boxed{\text{prep}} \end{bmatrix} \bullet \boxed{\text{year}} \ \& \ \text{@seek(year_number)} \mid \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_year \\ \text{ID} & \boxed{\text{year}} \end{bmatrix} \right) | \left(\begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_this_next_last \\ \text{ID} & \boxed{\text{year}} \end{bmatrix} \bullet \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"year"} \end{bmatrix} \right) \rightarrow \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{DESCRIPTOR} & \boxed{\text{descript}} \\ \text{PREPOSITIONS} & \langle \boxed{\text{prep}} . *top* \rangle \\ \text{YEAR} & \boxed{\text{year}} \end{bmatrix}$.

en_year_noun :> $\begin{bmatrix} morph \\ \text{POS} & det \end{bmatrix} \bullet \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_year \\ \text{ID} & \boxed{\text{year}} \\ \text{SURFACE} & \boxed{\text{sf}} \end{bmatrix} \bullet \begin{bmatrix} morph \\ \text{POS} & noun \end{bmatrix} \rightarrow \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{SURFACE} & \boxed{\text{sf}} \\ \text{YEAR} & \boxed{\text{year}} \end{bmatrix}$.

en_span_year :> $\left(\begin{bmatrix} token \\ \text{SURFACE} & \texttt{"from"} \end{bmatrix} \bullet \text{@seek(en_year)} \ \& \ \left[\text{YEAR} \ \boxed{\text{year1}} \right] \boxed{\text{year1}} \ \& \ \text{@seek(year_number)} \bullet \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"to"} \end{bmatrix} | \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"until"} \end{bmatrix} \bullet \text{@seek(en_year)} \ \& \ \left[\text{YEAR} \ \boxed{\text{year2}} \right] \boxed{\text{year2}} \ \& \ \text{@seek(year_number)} \right) | \left(\text{@seek(en_year)} \ \& \ \left[\text{YEAR} \ \boxed{\text{year1}} \right] \boxed{\text{year1}} \ \& \ \text{@seek(year_number)} \bullet \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"-"} \end{bmatrix} \bullet \text{@seek(en_year)} \ \& \ \left[\text{YEAR} \ \boxed{\text{year2}} \right] \boxed{\text{year2}} \ \& \right.$

en_century :> $\begin{bmatrix} morph \\ \text{POS} & adp \\ \text{SURFACE} & \boxed{\text{prep}} \end{bmatrix}^{?} \bullet \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"the"} \end{bmatrix}^{?} \bullet \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_dofm \\ \text{ID} & \boxed{\text{century}} \end{bmatrix} | \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_this_next_last \\ \text{ID} & \boxed{\text{century}} \end{bmatrix} \bullet \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"century"} \end{bmatrix} \rightarrow \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{PREPOSITIONS} & \langle \boxed{\text{prep}} . *top* \rangle \\ \text{CENTURY} & \boxed{\text{century}} \end{bmatrix}$.

en_week :> $\begin{bmatrix} morph \\ \text{POS} & adp \\ \text{SURFACE} & \boxed{\text{prep}} \end{bmatrix}^{?} \bullet \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"the"} \end{bmatrix}^{?} \bullet \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_this_next_last \\ \text{ID} & \boxed{\text{week}} \end{bmatrix} | \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_dofm \\ \text{ID} & \boxed{\text{week}} \end{bmatrix} \bullet \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"week"} \end{bmatrix} \bullet \left(\begin{bmatrix} token \\ \text{SURFACE} & \texttt{"of"} \end{bmatrix} \bullet \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_month_word \\ \text{ID} & \boxed{\text{month}} \end{bmatrix} \right)^{?} \rightarrow \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{PREPOSITIONS} & \langle \boxed{\text{prep}} . *top* \rangle \\ \text{MONTH} & \boxed{\text{month}} \\ \text{WEEK} & \boxed{\text{week}} \end{bmatrix}$.

en_part_of_year :> $\left(\begin{bmatrix} morph \\ \text{POS} & adp \\ \text{SURFACE} & \boxed{\text{prep}} \end{bmatrix}^{?} \bullet \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_this_next_last \\ \text{ID} & \boxed{\text{descript}} \end{bmatrix} \bullet \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_pofy \\ \text{ID} & \boxed{\text{pofy}} \end{bmatrix} \right) | \left(\left(\begin{bmatrix} token \\ \text{SURFACE} & \boxed{\text{prep}}\texttt{"in"} \end{bmatrix} | \begin{bmatrix} token \\ \text{SURFACE} & \boxed{\text{prep}}\texttt{"In"} \end{bmatrix} \right)^{?} \bullet \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_pofy \\ \text{ID} & \boxed{\text{pofy}} \end{bmatrix} \right) \rightarrow \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{PREPOSITIONS} & \langle \boxed{\text{prep}} . *top* \rangle \\ \text{DESCRIPTOR} & \boxed{\text{descript}} \\ \text{PART-OF-YEAR} & \boxed{\text{pofy}} \end{bmatrix}$.

en_part_of_year_with_year :> $\begin{bmatrix} morph \\ \text{POS} & adp \\ \text{SURFACE} & \boxed{\text{prep}} \end{bmatrix}^{?} \bullet \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"the"} \end{bmatrix}^{?} \bullet \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_pofy \\ \text{ID} & \boxed{\text{pofy}} \end{bmatrix} \bullet \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"of"} \end{bmatrix} \bullet \boxed{\text{year}} \ \& \ \text{@seek(year_number)} \rightarrow \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{PREPOSITIONS} & \langle \boxed{\text{prep}} . *top* \rangle \\ \text{YEAR} & \boxed{\text{year}} \\ \text{PART-OF-YEAR} & \boxed{\text{pofy}} \end{bmatrix}$.

en_part_of_day :> $\begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_this_next_last \\ \text{ID} & \boxed{\text{descript}} \end{bmatrix} | \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_early_late \\ \text{ID} & \boxed{\text{descript}} \end{bmatrix} \bullet \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_pofd \\ \text{ID} & \boxed{\text{pofd}} \end{bmatrix} \rightarrow \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{DESCRIPTOR} & \boxed{\text{descript}} \\ \text{PART-OF-DAY} & \boxed{\text{pofd}} \end{bmatrix}$.

en_tonight :> $\begin{bmatrix} morph \\ \text{POS} & adverb \\ \text{STEM} & \texttt{"tonight"} \end{bmatrix} \rightarrow \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{DESCRIPTOR} & \texttt{"this"} \\ \text{PART-OF-DAY} & night \end{bmatrix}$.

en_date :> $\begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_month \\ \text{ID} & \boxed{\text{month}} \end{bmatrix} \bullet \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"-"} \end{bmatrix} | \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"/"} \end{bmatrix} \bullet \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_dofm \\ \text{ID} & \boxed{\text{dofm}} \end{bmatrix} \bullet \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"-"} \end{bmatrix} | \begin{bmatrix} token \\ \text{SURFACE} & \texttt{"/"} \end{bmatrix} \bullet \boxed{\text{year}} \ \& \ \text{@seek(year_number)} \mid \begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_year \\ \text{ID} & \boxed{\text{year}} \end{bmatrix} \rightarrow \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{YEAR} & \boxed{\text{year}} \\ \text{MONTH} & \boxed{\text{month}} \\ \text{DOFM} & \boxed{\text{dofm}} \end{bmatrix}$.

en_special_day :> $\begin{bmatrix} gazetteer \\ \text{GTYPE} & g_en_special_day \\ \text{SURFACE} & \boxed{\text{special_day}} \end{bmatrix} \bullet \boxed{\text{year}} \ \& \ \text{@seek(year_number)}^{?} \rightarrow \begin{bmatrix} point \\ \text{MUC-TYPE} & date \\ \text{YEAR} & \boxed{\text{year}} \\ \text{SPECIAL-DAY} & \boxed{\text{special_day}} \end{bmatrix}$.