### Sample grammar for ATIS queries

### CS187

## This grammar is intended to cover ATIS flight ID queries only. It

## assumes that such queries are a single noun phrase, perhaps

## preceded and followed by other text that can be ignored. (The

## nonterminals PREIGNORE and POSTIGNORE capture this text.)

##

## Conventions used in this grammar:

##

## The start nonterminal is S. Other nonterminal names are typically

## syntactic phrase types (e.g., NP, PP, Det, P) followed by a

## semantic category (e.g., FLIGHT, AIRLINE), separated by an underscore.

## The phrase type TERM is used for lexical lists for a particular semantic

## category.

##

S -> NP\_FLIGHT

| PREIGNORE NP\_FLIGHT

| NP\_FLIGHT POSTIGNORE

| PREIGNORE NP\_FLIGHT POSTIGNORE

NP\_FLIGHT -> DET NOM\_FLIGHT

| NOM\_FLIGHT

NOM\_FLIGHT -> N\_FLIGHT

| ADJ NOM\_FLIGHT

N\_FLIGHT -> TERM\_FLIGHT

| N\_FLIGHT PP

TERM\_FLIGHT -> 'flights'

| 'flight'

| 'to' 'fly'

## Pre-noun (primarily adjectival) flight modifiers

ADJ -> ADJ\_AIRLINE

| ADJ\_DATE

| ADJ\_FLIGHTTYPE

| ADJ\_TIME

| ADJ\_PRICE

| ADJ\_CLASS

| ADJ\_FOOD

| ADJ\_PLACE

## Post-noun (prepositional phrase and relative clause) flight modifiers

PP -> PP\_AIRLINE

| PP\_DATE

| PP\_TIME

| PP\_PLACE

| PP\_PRICE

| PP\_CLASS

| PP\_FOOD

DET -> 'all' 'the'

| 'all'

| 'a'

| 'an'

| 'the'

| 'any'

| 'all' 'of' 'the'

| 'this'

| 'this' 'coming'

| 'next'

| TERM\_WEEKDAY "'s"

#### FLIGHT PROPERTIES ####

## Airline information

## \*\*\*\* TODO \*\*\*\*

## Airline information includes phrases like "United" or "on United Airlines"

## as in the following queries:

## show me flights on united airlines

## show me united flights

## list all continental airlines flights on tuesdays

## These phrases are incorporated into the grammar above via the nonterminals

## PP\_AIRLINE and ADJ\_AIRLINE. You should provide definitions for these

## nonterminals here. We've provided some useful definitions for some lexical

## lists.

PP\_AIRLINE -> P\_AIRLINE PP\_AIRLINE

| PP\_AIRLINE PP\_AIRLINE

| ADJ\_AIRLINE PP\_AIRLINE

ADJ\_AIRLINE -> ADJ\_AIRLINE ADJ\_AIRLINE

| TERM\_AIRBRAND

| TERM\_AIRBRANDTYPE

P\_AIRLINE -> 'on'

| 'for'

| 'with'

TERM\_AIRBRAND -> 'continental'

| 'american'

| 'united'

| 'northwest'

| 'us'

| 'delta'

| 'twa'

| 'air' 'canada'

| 'midwest' 'express'

| 'trans' 'world'

TERM\_AIRBRANDTYPE -> 'airline'

| 'airlines'

| 'air'

## Flight type information

ADJ\_FLIGHTTYPE -> ADJ\_FLIGHTTYPESIMPLE

| ADJ\_FLIGHTTYPESIMPLE 'and' ADJ\_FLIGHTTYPE

| ADJ\_FLIGHTTYPESIMPLE 'or' ADJ\_FLIGHTTYPE

ADJ\_FLIGHTTYPESIMPLE -> 'round' 'trip'

| 'round-trip'

| 'return'

| 'one' 'way'

| 'nonstop'

| 'direct'

| 'connecting'

## Other properties (cost, class, food)

ADJ\_PRICE -> 'cheapest'

| 'lowest' 'cost'

| 'least' 'expensive'

| 'inexpensive'

| 'cheap'

| 'expensive'

| 'highest' 'cost'

| 'most' 'expensive'

PP\_PRICE -> 'less' 'than' AMOUNT 'dollars'

| 'with' 'the' 'lowest' 'fare'

| 'the' 'cheapest' 'way' 'possible'

| 'with' 'the' 'highest' 'fare'

AMOUNT -> DOLLAR '.' CENTS

| DOLLAR

DOLLAR -> '$' DOLLAR

| NUM

CENTS -> NUM

NUM -> NUM NUM

| '0'

| '1'

| '2'

| '3'

| '4'

| '5'

| '6'

| '7'

| '8'

| '9'

ADJ\_CLASS -> 'economy'

| 'thrift' 'economy'

| 'first' 'class'

| 'first-class'

| 'transcontinental'

| 'available'

| 'possible'

PP\_CLASS -> ADJ\_CLASS

ADJ\_FOOD -> NP\_FOOD

PP\_FOOD -> P\_FOOD NP\_FOOD

NP\_FOOD -> 'dinner'

| 'lunch'

| 'breakfast'

| 'a' 'meal'

P\_FOOD -> 'serving'

| 'with'

#### DATES ####

ADJ\_DATE -> TERM\_WEEKDAY

PP\_DATE -> P\_DATE NP\_DATE

| NP\_DATE

P\_DATE -> 'on'

| 'returning' 'on'

| 'of'

| 'for'

| 'next'

| 'the' 'next'

| 'in' 'the' 'next'

| 'of' 'next'

| 'leaving'

| 'departing'

| 'departing' 'on'

| 'which' 'leave'

| 'leaving' 'on'

| 'arriving'

| 'arriving' 'on'

| 'that' 'arrive' 'on'

| 'which' 'arrive' 'on'

| 'a' 'week' 'from'

NP\_DATE -> TERM\_WEEKDAY

| 'a' TERM\_WEEKDAY

| 'this' TERM\_WEEKDAY

| 'this' 'coming'

| TERM\_WEEKDAY ADJTIME

| NP\_MDYDATE

| 'saturdays'

| 'sundays'

| 'mondays'

| 'tuesdays'

| 'wednesdays'

| 'thursdays'

| 'fridays'

| 'day'

| 'week'

| 'today'

| 'tomorrow'

| 'the' 'day' 'after' 'tomorrow'

| 'weekdays'

NP\_MDYDATE -> TERM\_MONTH TERM\_DAY YEAR

| TERM\_MONTH TERM\_DAY

| 'the' TERM\_DAY

| TERM\_MONTH TERM\_DAY 'or' TERM\_DAY

| 'the' TERM\_DAY 'or' TERM\_DAY

| 'either' TERM\_MONTH TERM\_DAY 'or' TERM\_DAY

| 'either' 'the' TERM\_DAY 'or' 'the' TERM\_DAY

| 'the' TERM\_DAY 'of' TERM\_MONTH

| TERM\_DAY 'of' TERM\_MONTH

| 'either' 'the' TERM\_DAY 'or' 'the' TERM\_DAY 'of' TERM\_MONTH

| 'the' TERM\_DAY 'of' TERM\_MONTH 'or' 'the' 'day' 'of' TERM\_MONTH

| 'either' 'the' TERM\_DAY 'of' TERM\_MONTH 'or' 'the' TERM\_DAY 'of' TERM\_MONTH

TERM\_WEEKDAY -> 'saturday'

| 'sunday'

| 'monday'

| 'tuesday'

| 'wednesday'

| 'thursday'

| 'friday'

| 'weekday'

TERM\_MONTH -> 'january'

| 'february'

| 'march'

| 'april'

| 'may'

| 'june'

| 'july'

| 'august'

| 'september'

| 'october'

| 'november'

| 'december'

TERM\_DAY -> 'first'

| 'second'

| 'third'

| 'fourth'

| 'fifth'

| 'sixth'

| 'seventh'

| 'eighth'

| 'ninth'

| 'tenth'

| 'eleventh'

| 'twelfth'

| 'thirteenth'

| 'fourteenth'

| 'fifteenth'

| 'sixteenth'

| 'seventeenth'

| 'eighteenth'

| 'nineteenth'

| 'twentieth'

| 'twenty-first'

| 'twenty' 'first'

| 'twenty-second'

| 'twenty' 'second'

| 'twenty-third'

| 'twenty' 'third'

| 'twenty-fourth'

| 'twenty' 'fourth'

| 'twenty-fifth'

| 'twenty' 'fifth'

| 'twenty-sixth'

| 'twenty' 'sixth'

| 'twenty-seventh'

| 'twenty' 'seventh'

| 'twenty-eighth'

| 'twenty' 'eighth'

| 'twenty-ninth'

| 'twenty' 'ninth'

| 'thirtieth'

| 'thirty-first'

| 'thirty' 'first'

| 'one'

| 'two'

| 'three'

| 'four'

| 'five'

| 'six'

| 'seven'

| 'eight'

| 'nine'

| 'ten'

| 'eleven'

| 'twelve'

| 'thirteen'

| 'fourteen'

| 'fifteen'

| 'sixteen'

| 'seventeen'

| 'eighteen'

| 'nineteen'

| 'twenty'

| 'twenty' 'one'

| 'twenty' 'two'

| 'twenty' 'three'

| 'twenty' 'four'

| 'twenty' 'five'

| 'twenty' 'six'

| 'twenty' 'seven'

| 'twenty' 'eight'

| 'twenty' 'nine'

| 'thirty'

| 'thirty' 'one'

TERM\_YEAR -> '1991'

| '1992'

#### TIMES ####

PP\_TIME -> P\_TIME NP\_TIME

P\_TIME -> 'that' 'arrive' 'before'

| 'that' 'arrives' 'before'

| 'arriving' 'before'

| 'arrival' 'by'

| 'which' 'arrive' 'before'

| 'departing' 'before'

| 'before'

| 'that' 'leaves' 'before'

| 'by'

| 'that' 'return' 'around'

| 'that' 'gets' 'in' 'around'

| 'arriving' 'around'

| 'arriving' 'about'

| 'that' 'arrive' 'soon' 'after'

| 'around'

| 'arrives'

| 'arriving' 'at'

| 'arriving'

| 'leaving' 'at'

| 'at'

| 'leaving'

| 'in'

| 'departing' 'at'

| 'on'

| 'that' 'leaves' 'at'

| 'arriving' 'after'

| 'which' 'arrives' 'after'

| 'that' 'arrives' 'after'

| 'which' 'leave' 'after'

| 'leaving' 'after'

| 'after'

| 'departing' 'after'

| 'departing' 'in'

| 'that' 'depart' 'after'

| 'that' 'leaves' 'in'

NP\_TIME -> TERM\_TIME

| 'afternoons'

| 'the' 'afternoon'

| 'the' 'late' 'afternoon'

| 'evenings'

| 'the' 'evening'

| 'mornings'

| 'the' 'morning'

| 'the' 'early' 'am'

| 'as' 'early' 'as' 'possible'

| 'earliest' 'possible' 'time'

| 'the' 'day'

| 'as' 'soon' 'thereafter' 'as' 'possible'

| UNK

ADJ\_TIME -> 'lunch' 'time'

| 'evening'

| 'dinnertime'

| 'late'

| 'night'

| 'latest' 'possible'

| 'latest'

| 'tonight'

| 'morning'

| 'early'

| 'earliest' 'possible'

| 'earliest'

| 'afternoon'

| SIMPLETIME

TERM\_TIME -> 'one' | '1'

| 'two' | '2'

| 'three' | '3'

| 'four' | '4'

| 'five' | '5'

| 'six' | '6'

| 'seven' | '7'

| 'eight' | '8'

| 'nine' | '9'

| 'ten' | '10'

| 'eleven' | '11'

| 'twelve' | '12' | 'noon'

| 'midnight'

| TERM\_TIME TERM\_TIMEMOD

TERM\_TIMEMOD -> 'am'

| 'oclock'

| "o'clock"

| 'noon'

| 'pm'

| 'midnight'

#### PLACES ####

## \*\*\*\* TODO \*\*\*\*

## Place information includes phrases like "boston" or "from logan airport"

## or "between milwaukee and jfk" as in the following queries:

## show me boston flights

## are there any flights from logan airport tomorrow

## list all continental airlines flights between milwaukee and jfk

## These phrases are incorporated into the grammar above via the nonterminals

## ADJ\_PLACE and PP\_PLACE. You should provide definitions for these

## nonterminals here. We've provided some useful definitions for some lexical

## lists.

ADJ\_PLACE -> P\_PLACE

| 'between'

PP\_PLACE -> PP\_PLACE PP\_PLACE

| PP\_PLACE 'and' PP\_PLACE

| PP\_PLACE 'or' PP\_PLACE

| ADJ\_PLACE PP\_PLACE

| TERM\_PLACE

| TERM\_AIRPORT

| 'airport'

P\_PLACE -> 'to'

| 'that' 'arrive' 'at'

| 'that' 'arrives' 'in'

| 'coming' 'back' 'to'

| 'that' 'go' 'to'

| 'and' 'then' 'to'

| 'arriving' 'in'

| 'and' 'arriving' 'in'

| 'and' 'arrive' 'in'

| 'to' 'arrive' 'in'

| 'arrive' 'in'

| 'going' 'to'

| 'into'

| 'for'

| 'with' 'the' 'destination' 'city' 'of'

| 'arriving'

| 'goes' 'to'

| 'flying' 'into'

| 'goes' 'on' 'to'

| 'reaching'

| 'in'

| 'and' 'then'

| 'arriving' 'to'

| 'from'

| 'leaving'

| 'return' 'from'

| 'leaving' 'from'

| 'departing' 'from'

| 'departing'

| 'go' 'from'

| 'going' 'from'

| 'back' 'from'

| 'that' 'goes' 'from'

| 'that' 'departs'

| 'which' 'leaves' 'from'

| 'which' 'leave'

| 'that' 'leave'

| 'originating' 'in'

| 'leave'

| 'out' 'of'

| 'leaves' 'from'

| 'to' 'get' 'from'

| 'via'

| 'with' 'a' 'stopover' 'in'

| 'with' 'a' 'layover' 'in'

| 'with' 'a' 'stopover' 'at'

| 'and' 'a' 'stopover' 'in'

| 'stop' 'in'

| 'stopping' 'in'

| 'make' 'a' 'stop' 'in'

| 'with' 'a' 'stop' 'in'

| 'with' 'one' 'stop' 'in'

| 'go' 'through'

| 'which' 'go' 'through'

| 'makes' 'a' 'stopover' 'in'

| 'that' 'stops' 'in'

| 'that' 'stops' 'over' 'in'

| 'by' 'way' 'of'

| 'connecting' 'through'

| 'that' 'will' 'stop' 'in'

| 'which' 'connects' 'in'

| 'arriving' 'and' 'departing' 'at'

TERM\_AIRPORT -> 'boston' 'logan'

| 'logan'

| 'bwi'

| 'general' 'mitchell' 'international'

| 'general' 'mitchell'

| 'jfk'

| 'kennedy' 'airport'

| 'laguardia' 'airport'

| 'love' 'field'

TERM\_PLACE -> 'anywhere'

| 'atlanta'

| 'austin'

| 'baltimore'

| 'boston'

| 'burbank'

| 'charlotte'

| 'chicago'

| 'cincinnati'

| 'cleveland'

| 'cleveland' 'ohio'

| 'columbus'

| 'dallas' 'fort' 'worth'

| 'dallas'

| 'denver'

| 'denver' 'colorado'

| 'detroit'

| 'fort' 'worth'

| 'houston'

| 'indianapolis'

| 'kansas' 'city'

| 'las' 'vegas'

| 'long' 'beach'

| 'los' 'angeles'

| 'memphis'

| 'miami'

| 'milwaukee'

| 'minneapolis'

| 'montreal'

| 'montreal' 'quebec'

| 'montreal' 'canada'

| 'nashville'

| 'new' 'york' 'city'

| 'new' 'york'

| 'newark'

| 'newark' 'new' 'jersey'

| 'oakland'

| 'oakland' 'california'

| 'ontario'

| 'orlando'

| 'orlando' 'florida'

| 'philadelphia'

| 'philly'

| 'phoenix'

| 'pittsburgh'

| 'salt' 'lake' 'city'

| 'san' 'diego'

| 'san' 'diego' 'california'

| 'san' 'francisco'

| 'san' 'jose'

| 'seattle'

| 'st.' 'louis'

| 'st.' 'paul'

| 'st.' 'petersburg'

| 'tacoma'

| 'tacoma' 'washington'

| 'tampa'

| 'toronto'

| 'washington'

| 'washington' 'dc'

| 'dc'

| 'westchester' 'county'

| 'various' 'cities'

#### IGNORABLE ####

PREIGNORE -> PREIGNORESYMBOL

| PREIGNORESYMBOL PREIGNORE

PREIGNORESYMBOL -> 'me'

| 'show'

| 'now'

| 'only'

| 'can'

| 'you'

| 'the'

| 'itinerary'

| 'of'

| 'also'

| 'a'

| 'list'

| 'could'

| 'give'

| 'which'

| 'what'

| 'is'

| "what's"

| 'are'

| 'my'

| 'choices'

| 'for'

| 'i'

| 'would'

| 'like'

| "i'd"

| 'to'

| 'see'

| 'have'

| 'make'

| 'book'

| 'find'

| 'information'

| 'on'

| 'know'

| 'some'

| 'hello'

| 'yes'

| 'please'

| 'repeat'

| 'do'

| 'have'

| 'there'

| 'need'

| 'hi'

| 'get'

| 'may'

| 'listing'

| 'listings'

| 'travel'

| 'arrangements'

| 'okay'

| 'want'

| 'tell'

| 'about'

| 'how'

| 'would'

| 'be'

| 'able'

| 'put'

| 'requesting'

| "i'm"

| 'looking'

| 'display'

POSTIGNORE -> POSTIGNORESYMBOL

| POSTIGNORESYMBOL POSTIGNORE

POSTIGNORESYMBOL -> 'please'

| 'there'

| 'are'

| 'currently'

| 'do'

| 'you'

| 'have'

| 'fares'

| 'information'

| 'i'

| 'want'

| 'would'

| 'like'

| 'the'

| 'flight'

| 'be'

| 'go'

| 'departures'

| 'is'

| 'such'

| 'a'

| 'that'

| 'serves'

| 'both'

| 'and'

| 'along'

| 'with'

| 'can'

| 'get'

| "i'd"

| 'traveling'

| 'for'

| 'me'

| UNK

| '.'

| '?'