# Exercise 1 – Top down strategy

a) "Book that flight"

Using the top down strategy, the following parse trees will be constructed until the sentence "Book that flight." can be matched:

step	list of nodes	rule
init	[S:]	S → NP VP
1	[S: [NP, VP]]	NP → det NOM
2	[S: [NP: [det, NOM], VP]]	det → that
3	[S: [NP: [det: that – **fail**, NOM], VP]]	det → this
4	[S: [NP: [det: this – **fail**, NOM], VP]]	det → a
5	[S: [NP: [det: a – **fail**, NOM], VP]]	NP → PropN
6	[S: [NP: [PropN], VP]]	PropN → Huston
7	[S: [NP: [PropN: Huston – **fail**], VP]]	PropN → TWA
8	[S: [NP: [PropN: TWA – **fail**], VP]]	S → Aux NP VP
9	[S: [Aux, NP, VP]]	Aux → does
10	[S: [Aux: does – **fail**, NP, VP]]	S → VP
11	[S: [VP]]	VP → verb NP
12	[S: [VP:[verb, NP]]]	verb → book
13	[S: [VP:[verb: book, NP]]]	NP → det NOM
14	[S: [VP:[verb: book, NP: [det, NOM]]]]	det → that
15	[S: [VP:[verb: book, NP: [det: that, NOM]]]]	NOM → noun
16	[S: [VP:[verb: book, NP: [det: that, NOM:[noun]]]]]	noun → book
17	[S: [VP:[verb: book, NP: [det: that, NOM:[noun: book – **fail**]]]]]	noun → flight
18	[S: [VP:[verb: book, NP: [det: that, NOM:[noun: flight]]]]]	noun → meal

(First) Matching parse tree:
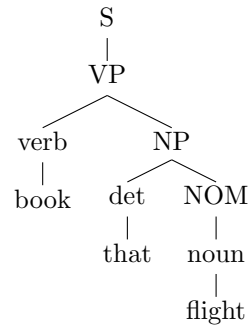
In general, the top down strategy does not necessarily stop when a matching tree is found. There could be multiple matching trees, but in this example this is not the case – applying all the possible other rules will lead to non-matching trees.

b) "Does this flight include a meal?"

step	list of nodes	rule
init	[S:]	S → NP VP
…	… – **fail**	S → Aux NP VP
9	[S: [Aux, NP, VP]]	Aux → does
10	[S: [Aux: does, NP, VP]]	NP → det NOM
11	[S: [Aux: does, NP: [det, NOM], VP]]	det → that
12	[S: [Aux: does, NP: [det: that – **fail**, NOM], VP]]	det → this
13	[S: [Aux: does, NP: [det: this, NOM], VP]]	det → this
14	[S: [Aux: does, NP: [det: this, NOM], VP]]	NOM → noun
15	[S: [Aux: does, NP: [det: this, NOM: [noun]], VP]]	noun → book
16	[S: [Aux: does, NP: [det: this, NOM: [noun: book – **fail**]], VP]]	noun → flight
17	[S: [Aux: does, NP: [det: this, NOM: [noun: flight]], VP]]	VP → verb NP
18	[S: [… , VP: [verb, NP]]]	verb → book
19	[S: [… , VP: [verb: book – **fail**, NP]]]	verb → include
20	[S: [… , VP: [verb: include, NP]]]	NP → det NOM
21	[S: [… , VP: [verb: include, NP: [det, NOM]]]]	det → that
22	[S: [… , VP: [verb: include, NP: [det: that – **fail**, NOM]]]]	det → this
23	[S: [… , VP: [verb: include, NP: [det: this – **fail**, NOM]]]]	det → a
24	[S: [… , VP: [verb: include, NP: [det: a, NOM]]]]	NOM → noun
25	[S: [… , VP: [verb: include, NP: [det: a, NOM: [noun]]]]]	noun → book
26	[S: [… , VP: [verb: include, NP: [det: a, NOM: [noun: book – **fail**]]]]]	noun → flight
27	[S: [… , VP: [verb: include, NP: [det: a, NOM: [noun: flight – **fail**]]]]]	noun → meal
28	[S: [… , VP: [verb: include, NP: [det: a, NOM: [noun: meal]]]]]	

(First) Matching parse tree:

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