1 Parsing

Consider the following CFG.

S → NP VP
NP → NP Poss N
NP → D N
VP → V (NP) (PP)
PP → P NP

N → boy, girl
NP → Mary, paella, Spain
V → met, ate
D → the
P → on, in

2 Bottom-up parsing

	Type of transition	Rule used	Configuration
0	-	-	(ϵ, the girl ate paella in Spain)
1	shift	D → the	(D, girl ate paella in Spain)
2	shift	N → girl	(D N, ate paella in Spain)
3	reduce	NP → D N	(NP, ate paella in Spain)
4	shift	V → ate	(NP V, paella in Spain)
5	shift	NP → paella	(NP V NP, in Spain)
6	shift	P → in	(NP V NP P, Spain)
7	shift	NP → Spain	(NP V NP P NP, ϵ)
8	reduce	PP → P NP	(NP V NP PP, ϵ)
9	reduce	VP → V NP PP	(NP VP, ϵ)
10	reduce	S → NP VP	(S, ϵ)

3 Top-down parsing

	Type of transition	Rule used	Configuration
0	-	-	(S, the girl ate paella in Spain)
1	predict	S → NP VP	(NP VP, the girl ate paella in Spain)
2	predict	NP → D N	(D N VP, the girl ate paella in Spain)
3	match	D → the	(N VP, girl ate paella in Spain)
4	match	N → girl	(VP, ate paella in Spain)
5	predict	VP → V NP PP	(V NP PP, ate paella in Spain)
6	match	V → ate	(NP PP, paella in Spain)
7	match	NP → paella	(PP, in Spain)
8	predict	PP → P NP	(P NP, in Spain)
9	match	P → in	(NP, Spain)
10	match	NP → Spain	(ϵ, ϵ)

4 Left-corner parsing

	Type of transition	Rule used	Configuration
0	-	-	($\overline{\text{S}}$, the girl ate paella in Spain)
1	shift	D → the	(D $\overline{\text{S}}$, girl ate paella in Spain)
2	LC-predict	NP → D N	($\overline{\text{N}}$ NP $\overline{\text{S}}$, girl ate paella in Spain)
3	match	N → girl	(NP $\overline{\text{S}}$, ate paella in Spain)
4	LC-connect	S → NP VP	($\overline{\text{VP}}$, ate paella in Spain)
5	shift	V → ate	(V $\overline{\text{VP}}$, paella in Spain)
6	LC-connect	VP → V NP PP	($\overline{\text{NP}}$ $\overline{\text{PP}}$, paella in Spain)
7	match	NP → paella	($\overline{\text{PP}}$, in Spain)
8	shift	P → in	(P $\overline{\text{PP}}$, Spain)
9	LC-connect	PP → P NP	($\overline{\text{NP}}$, Spain)
10	match	NP → Spain	(ϵ, ϵ)