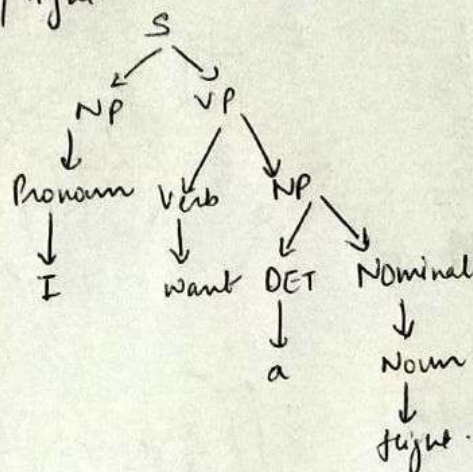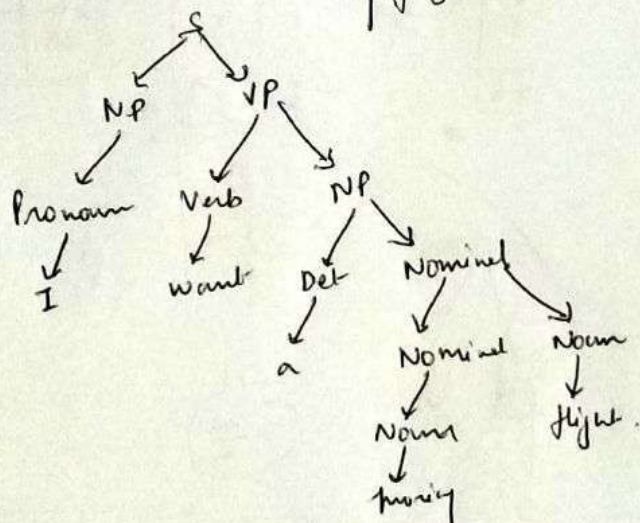# NLP – ECS763P – Lab sheet 3

PART A – Generative Grammer
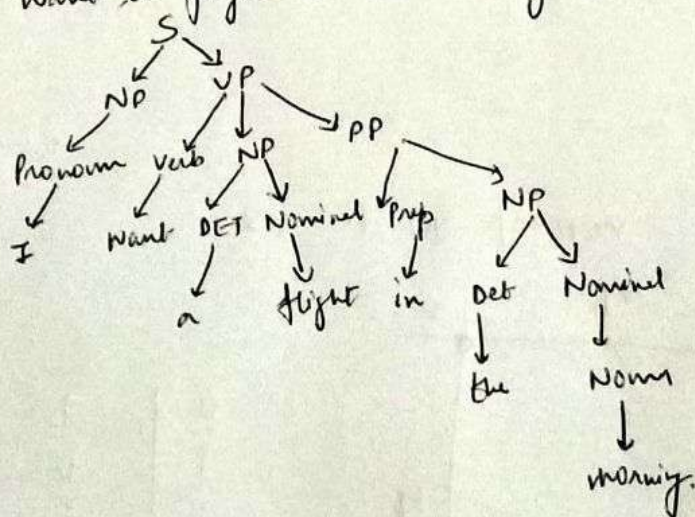
1. Basic level Question (3 pts)

   1. I want a flight

   2. I want a morning flight.

   3. I want a flight in the morning from Baltimore.

2. Medium Level Questions to add production to VP on the left hand side

1). I want a flight in the morning from Baltimore.

$$VP \rightarrow VP\ PP$$

2) I want a flight in the morning from Baltimore to Los Angeles
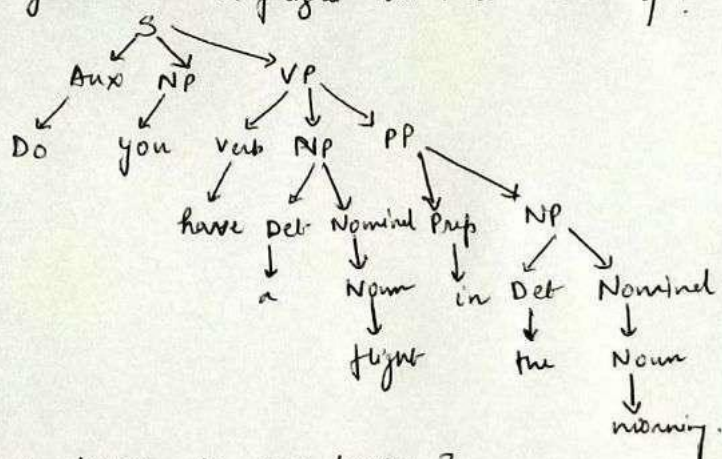
$$VP \rightarrow VP\ PP\ PP$$

3) I ~~want~~ need a trip ~~a~~ in the morning from Baltimore to Los Angeles

$$VP \rightarrow VP\ PP\ PP$$

3. Medium Level Questions

1) Do you have a flight in the morning?

S
- Aux → Do
- NP → you
- VP
  - Verb → have
  - NP
    - Det → a
    - Nominal
      - Noun → flight
  - PP
    - Prep → in
    - NP
      - Det → the
      - Nominal
        - Noun → morning.

2) What flights do you have?

S
- Wh → What
- NP → flights
- Aux → do
- NP → Pronoun → you
- VP → have
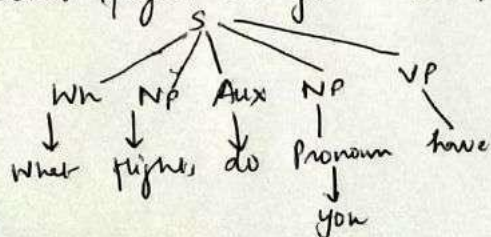
4) Difficult Level Questions

① direct flight.

NP
- AP → Adj → direct
- Nominal → Noun → flight
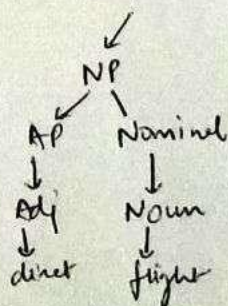
Rules

$$NP \rightarrow (Det)\ (Card)\ (Ord)\ (Quant)\ (AP)\ Nominal$$
$$AP \rightarrow Adj$$
$$AP \rightarrow Adj\ AP$$

② first direct flight.

NP
- Ord → first
- AP → Adj → direct
- Nominal → flight
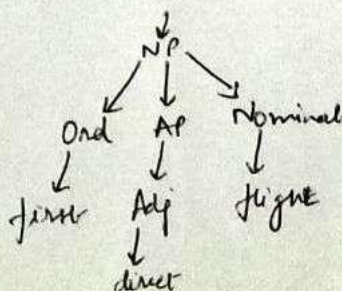
③ first Non stop direct flight

NP
- Ord → first
- AP
  - Adj → Nonstop
  - AP → direct
- Nominal → Noun → flight.
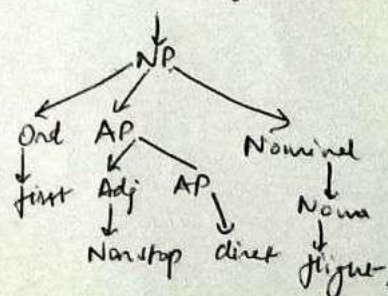
5) Difficult level Question   Baltimore's flight

        Det → NP's

```
            NP
           ↙  ↘
        DET    Nominal
         ↓        ↓
       NP's      Noun
         ↓        ↓
    Baltimore's  flight.
```
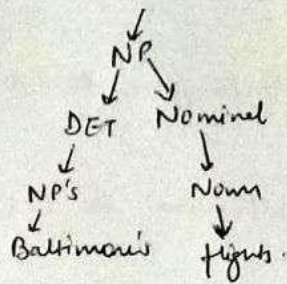
1. Basic level Question.

   1) John
      ___
      NP

   2) John   and   Mary.   X = NP
      ___ _____ ___
      NP   (NP\NP)/NP   NP
                    ←_____
                     NP\NP
      ←_____
            NP

   3) John   Slept.
      ___   _____
      NP   NP\S
          ←_____
              S

   4) John   slept   and   Snored.   X = NP\S
      ~~~~   ~~~~   ~~~~~~~~~~~   ~~~~~
      NP   NP\S   (NP\S\NP\S)\NP\S   NP\S

      NP   NP\S   (NP\S\NP\S)/NP\S   NP\S
                           _____
                             ((NP\S)\(NP\S))
                    _____
                              NP\S
      _____
                              S

   5) John   and   Mary   Slept
      ___ _____ ___   _____
      NP   (NP\NP)/NP   NP   NP\S
           _____
                 NP\NP
      _____
            NP
      _____
                       S

   6) John   and   Mary   slept   and   Snored.
      ___   _____   ___   _____ _____   _____
      NP   (NP\NP)/NP   NP   NP\S   ((NP\S)\NP\S)/NP\S   NP\S
                                        _____
                                              (NP\S)\NP\S
                                        _____
                                                NP\S
      _____
              NP\NP
      _____
            NP
      _____
                                       S

7) John ate Pizza.
NP (NP\s)/NP NP
_____
     NP\S
_____
      S

(8) John   and   Mary   ate   Pizza   and   Pasta
NP (NP\NP)/NP NP (NP\s)/NP NP NP\NP/NP NP.
                                    _____
                                      NP\NP
                              _____
                                  NP
                         _____
                            NP\S
        _____
          NP\NP
_____
    NP
_____
                 S

2) Medium Level Questions. Bij = NP\NP
   1. Big   John
   NP\NP   NP
   _____
       NP

   3. Big   John   ate   Pizza
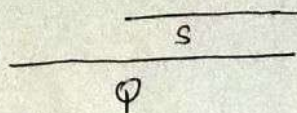   NP\NP   NP   NP\s/NP   NP
   _____
       NP
                    _____
                      NP\S
   _____
        S

   4 3. Big   John   and   Mary   Slept
       NP\NP   NP   NP\NP/NP   NP   NP\s
                  _____
                      NP   _____
                                     NP\NP
                   _____
                       NP
       _____
                       S

   2. Big   John   Slept.
   NP\NP   NP   NP\s
   _____
       NP
   _____
        S

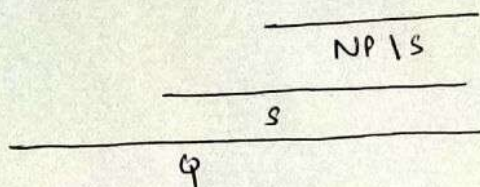3. Difficult level Question.   Did = S\Q

  1. Did John sleep?
     S\Q   NP   NP\S
     _____
            S
  _____
            Q

  2. Did   John   eat   Pizza ?
     S\Q   NP NP\S/NP NP
                  _____
                      NP\S
            _____
                      S
  _____
                      Q

4. Difficult level Question.

     1. What   did   John   eat ?
        S\Q   NP   NP   (NP\S)/NP
                       _____
                           NP\S
              _____
                         S
        _____
                         Q