1.
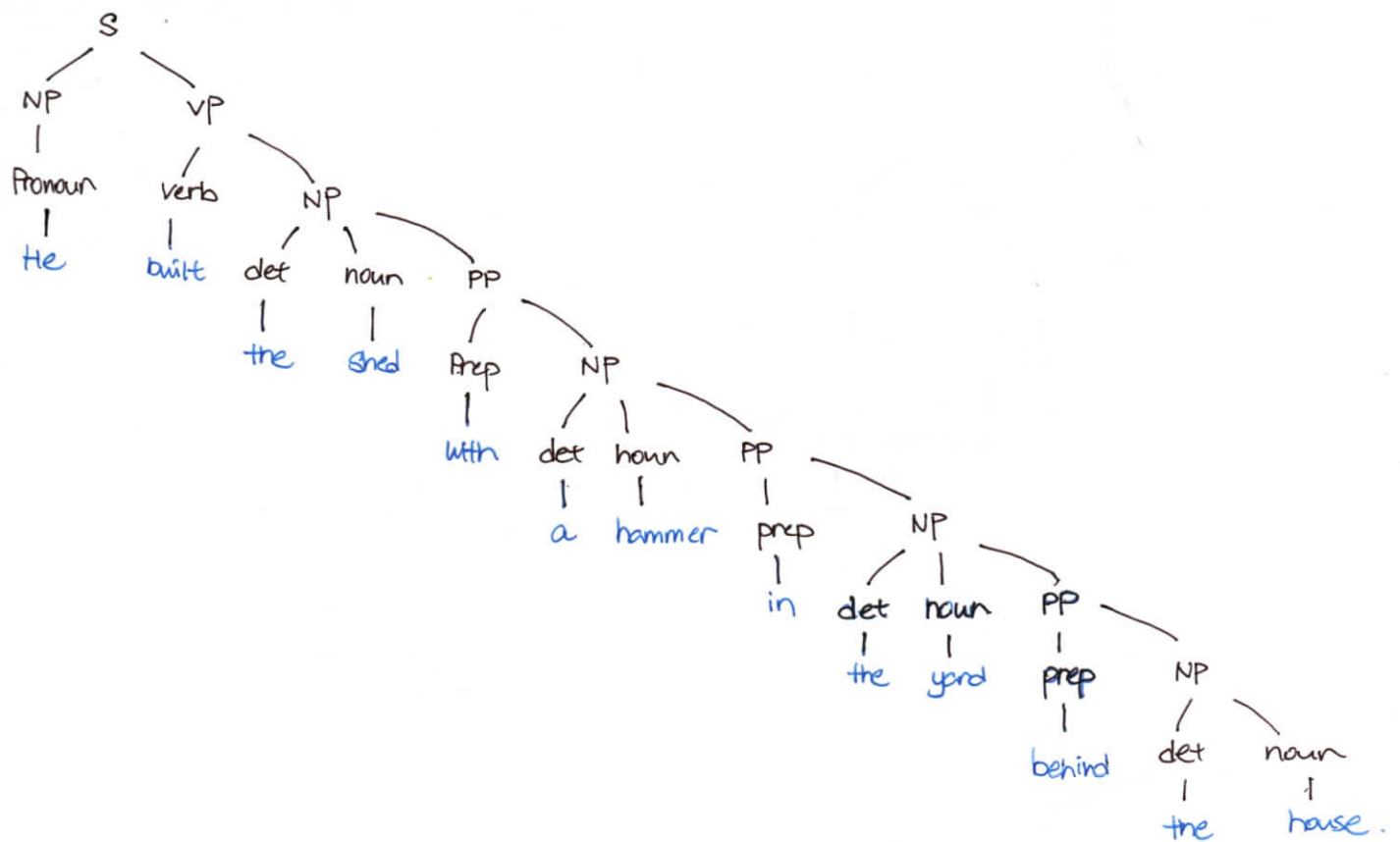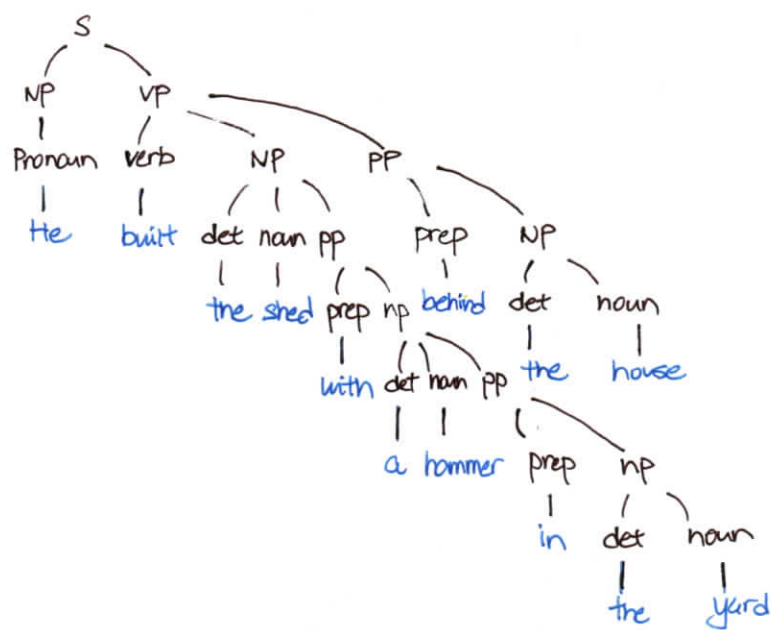
He built the shed with a hammer in the yard behind the house.
Pronoun verb det noun prep det noun prep det noun prep det noun

```
                    S
                  /   \
                NP      VP
                |      /  \
            Pronoun  verb   NP
                |    |     /  \
               He  built det  noun    PP
                        |     |      /   \
                       the   shed  Prep   NP
                                   |     / | \
                                  with  det hown   PP
                                        |   |     /  \
                                        a  hammer prep   NP
                                                 |     / | \
                                                 in  det noun   PP
                                                     |   |     /  \
                                                    the yard  prep   NP
                                                              |     /  \
                                                           behind det  noun
                                                                  |     |
                                                                 the  house.
```
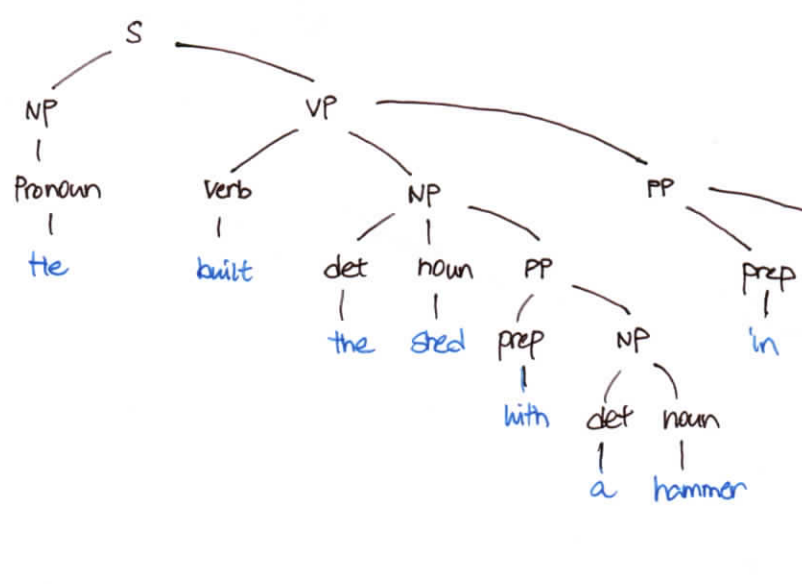
- Here, "built", "the shed with a hammer in the yard behind the house" is at the same level.
- The NP modifies the verb "built".
- "the shed with a hammer in the yard behind the house" is what is being built.
- It is the property of "the shed" to be "with a hammer in the yard behind the house".
  ⇒ The shed is with a hammer in the yard behind the house.
- It is the property of the hammer to be "in the yard behind the house".
  ⇒ The hammer is in the yard behind the house.
- It is the property of the yard to be "behind the house".
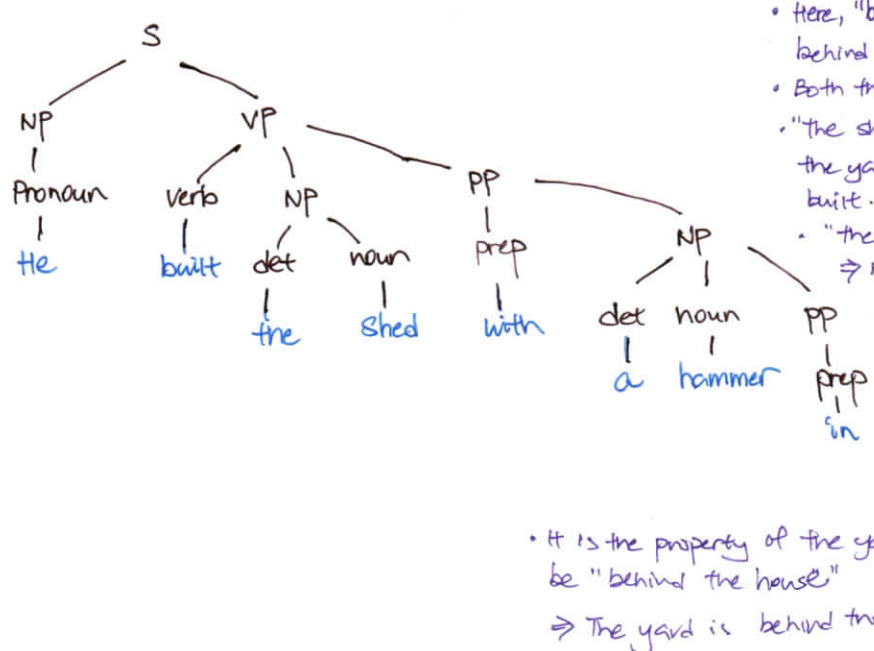 ⇒ The yard is behind the house.

He built the shed with a hammer in the yard behind the house.
Pronoun Verb det noun prep det noun prep det noun prep det noun

- "built", "the shed with a hammer in the yard" and "behind the house" is at the same level.
- Both NP and PP subtrees modify the verb "built"
- "the shed with a hammer in the yard" is what is built, "behind the house" is where it is built
- It is the property of "the shed" to be "with a hammer in the yard".
  ⇒ The shed is with a hammer in the yard.
- It is the property of "a hammer" to be "in the yard".
  ⇒ The hammer is in the yard.
- No idea where the yard is currently at, we just know that it is built behind the house.

- Here, "built", "the shed with a hammer" and "in the yard behind the house" is at the same level
- Both the NP and PP subtrees modify the verb "built".
- "the shed with a hammer" is what is built, "in the yard behind the house" is where it is built
- It is the property of "the shed" to be "with a hammer"
  ⇒ No idea where the shed and the hammer is at, only know it is built.
- It is the property of "the yard" to be "behind the house"
  ⇒ The yard is behind the house.

- Here, "built", "the shed", "with a hammer in the yard behind the house" is at the same level.
- Both the NP and PP subtrees modify the verb "built"
- "the shed" is what is built; "with a hammer in the yard behind the house" is how and where it is built.
- "the shed" has no property.
  ⇒ no idea where it is currently at, only know how and where it is built.
- It is the property of the hammer to be "in the yard behind the house"
  ⇒ The hammer is in the yard behind the house.
- It is the property of the yard to be "behind the house"
  ⇒ The yard is behind the house.

2(a)

S → NP VP	VP → time
S → VP NP	VP → flies
NP → time	VP → like
NP → flies	Noun → time
NP → arrow	Noun → flies
NP → Det Noun	Noun → arrow
NP → Noun Noun	Verb → time
NP → Noun PP	Verb → flies
VP → Verb NP	Verb → like
VP → Verb PP	Prep → like
PP → Prep NP	Det → an

(b)

time	flies	like	an	arrow
NP Noun / Verb VP	NP VP / S .			NP S / VP
	NP VP / Noun Verb			NP VP / S
		VP verb / Prep		VP S / PP
			Det	NP
				NP Noun

(c) There are 4 correct analyses of the sentence.

By pairing each non-terminal with pointers to the table entries from which it was derived, the parse table will contains all the possible parses for a given input.

These analyses can then be retrieved from the parse table by choosing an S, NP, VP etc. from cell [0, n] and then recursively retrieving its component constituents from the table. Refer to what I have drawn.

①

time   flies   like   an   arrow

NP Noun | NP VP | | | NP S
Verb VP | S | | | VP

| | NP VP | | NP VP
| | Noun Verb | | S

| | | VP verb | | VP S
| | | Prep | | PP

| | | | Det | NP

| | | | | NP Noun

②

time   flies   like   an   arrow

NP Noun | NP VP | | | NP S
Verb VP | S | | | VP

| | NP VP | | NP VP
| | Noun Verb | | S

| | | VP verb | | VP S
| | | Prep | | PP

| | | | Det | NP

| | | | | NP Noun

③

time   flies   like   an   arrow

NP Noun | NP VP | | | NP S
Verb VP | S | | | VP

| | NP VP | | NP VP
| | Noun Verb | | S

| | | VP verb | | VP S
| | | Prep | | PP

| | | | Det | NP

| | | | | NP Noun

④

time   flies   like   an   arrow

NP Noun | NP VP | | | NP S
Verb VP | S | | | VP

| | NP VP | | NP VP
| | Noun Verb | | S

| | | VP verb | | VP S
| | | Prep | | PP

| | | | Det | NP

| | | | | NP Noun

time   flies   like   an   arrow

NP Noun | NP VP | | | NP S
Verb VP | S | | | VP

| | NP VP | | NP VP
| | Noun Verb | | S

| | | VP verb | | VP S
| | | Prep | | PP

| | | | Det | NP

| | | | | NP Noun

time   flies   like   an   arrow

NP Noun | NP VP | | | NP S
Verb VP | S | | | VP

| | NP VP | | NP VP
| | Noun Verb | | S

| | | VP verb | | VP S
| | | Prep | | PP

| | | | Det | NP

| | | | | NP Noun

d)

① VP

```
VP
├── Verb
│   └── time
└── NP
    ├── Noun
    │   └── flies
    └── PP
        ├── Prep
        │   └── like
        └── NP
            ├── Det
            │   └── an
            └── Noun
                └── arrow
```
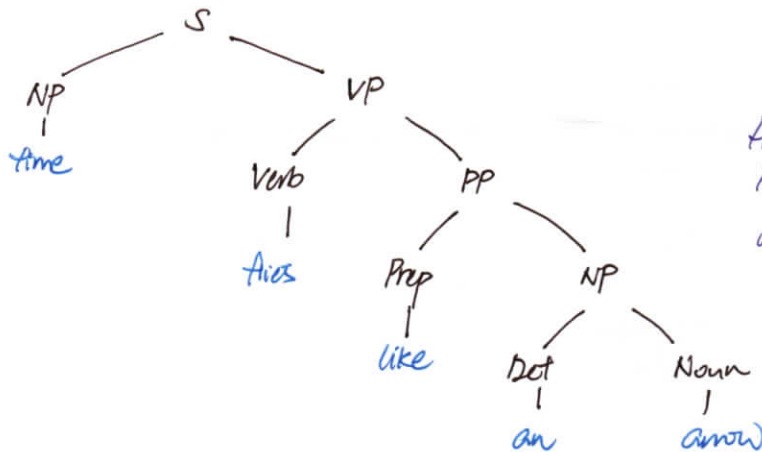
Here, "time" is a verb and "flies" is a noun. As "time" is an action here, and "flies" is a thing, here it means that we will time flies like how we will time an arrow.

i.e. Measure the speed of flies like you would measure the speed of an arrow.

②

```
S
├── NP
│   ├── Noun
│   │   └── time
│   └── Noun
│       └── flies
└── VP
    ├── Verb
    │   └── like
    └── NP
        ├── Det
        │   └── an
        └── Noun
            └── arrow
```
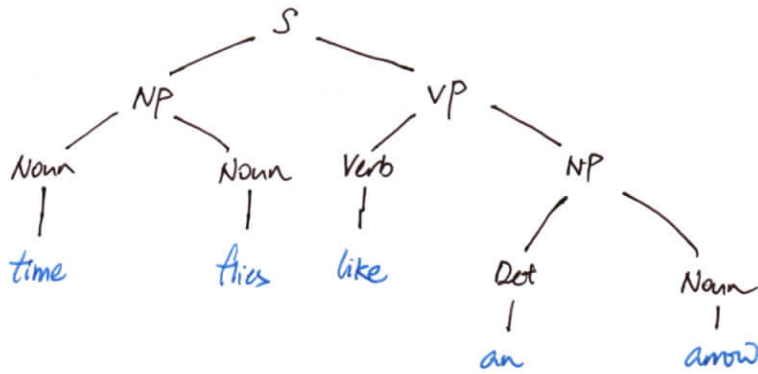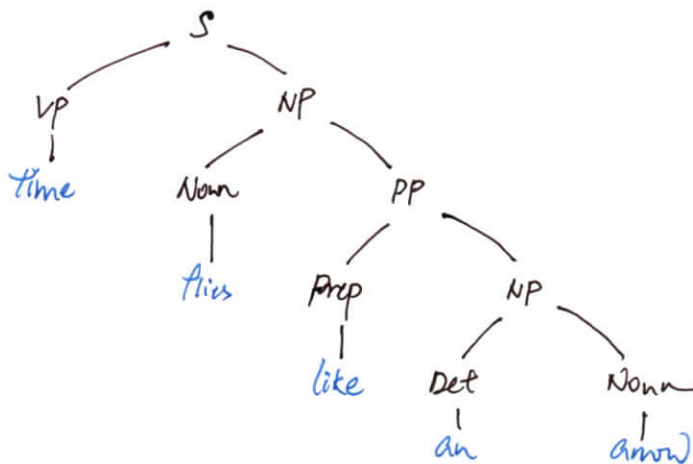
Here, "time" and "flies" are nouns and they both form a noun phrase. "like" is a verb, it is an action e.g. I like you.

Therefore, based on this syntax tree, "time flies" are a species of flies and they all like an arrow.

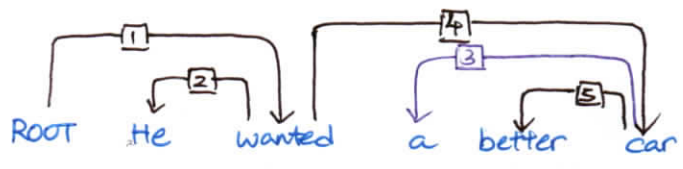i.e. Certain flying insects, called "timeflies", enjoy an arrow.

③

```
S
├── NP
│   └── time
└── VP
    ├── Verb
    │   └── flies
    └── PP
        ├── Prep
        │   └── like
        └── NP
            ├── Det
            │   └── an
            └── Noun
                └── arrow
```

Here, "time" is a NP or a noun, and "flies" is a verb. It is our modern understanding of "Time passes fast, as fast as an arrow travels.".
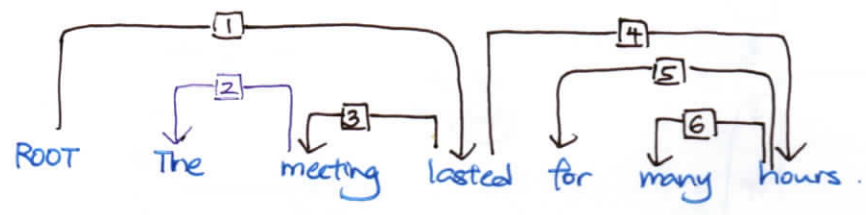
④

```
S
├── VP
│   └── time
└── NP
    ├── Noun
    │   └── flies
    └── PP
        ├── Prep
        │   └── like
        └── NP
            ├── Det
            │   └── an
            └── Noun
                └── arrow
```
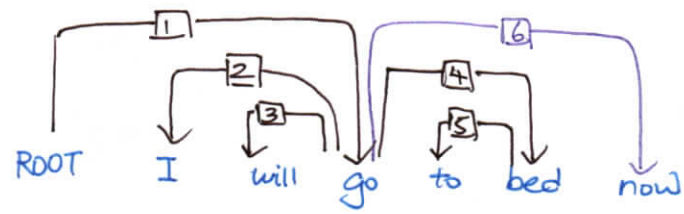
Similar to ①.

3(a)

ROOT   He   wanted   a   better   car

[1] [2] [3] [4] [5]

(b)

ROOT   The   meeting   lasted   for   many   hours .

[1] [2] [3] [4] [5] [6]

(c)

ROOT   I   will   go   to   bed   now

[1] [2] [3] [4] [5] [6]

4.

ROOT   The   old   man   slowly   opened   the   door

① root
② nsubj
③ amod
④ det
⑤ advmod
⑥ obj
⑦ det