Q.1. The simplest augmentation of the context-free grammar is the Probabilistic Context PCFG Free Grammar (PCFG), also known as the Stochastic Context-Free Grammar SCFG (SCFG), first proposed by Booth (1969).

Grammar		Lexicon
S → *NP VP*	[.80]	*Det* → *that* [.10] | *a* [.30] | *the* [.60]
S → *Aux NP VP*	[.15]	*Noun* → *book* [.10] | *flight* [.30]
S → *VP*	[.05]	| *meal* [.15] | *money* [.05]
NP → *Pronoun*	[.35]	| *flights* [.40] | *dinner* [.10]
NP → *Proper-Noun*	[.30]	*Verb* → *book* [.30] | *include* [.30]
NP → *Det Nominal*	[.20]	| *prefer*; [.40]
NP → *Nominal*	[.15]	*Pronoun* → *I* [.40] | *she* [.05]
Nominal → *Noun*	[.75]	| *me* [.15] | *you* [.40]
Nominal → *Nominal Noun*	[.20]	*Proper-Noun* → *Houston* [.60]
Nominal → *Nominal PP*	[.05]	| *NWA* [.40]
VP → *Verb*	[.35]	*Aux* → *does* [.60] | *can* [40]
VP → *Verb NP*	[.20]	*Preposition* → *from* [.30] | *to* [.30]
VP → *Verb NP PP*	[.10]	| *on* [.20] | *near* [.15]
VP → *Verb PP*	[.15]	| *through* [.05]
VP → *Verb NP NP*	[.05]	
VP → *VP PP*	[.15]	
PP → *Preposition NP*	[1.0]	

Draw the possible parse trees for deriving a sentence “Book the dinner flight”. Explain how PCFG is used for disambiguation.

Q.2.

```
S → NP VP          V → swam | ran | flew
VP → V NP          VP → swam | ran | flew
VP → VP PP         D → the | a | an
NP → D N           N → pilot | plane
NP → NP PP         NP → Edinburgh | Glasgow
PP → P NP          P → to
```

CYK algorithm uses bottom-up parsing technique. Apply the CYK algorithm on the sentence “The pilot flew the plane to Glasgow” using the grammar G and state whether the sentence is recognized or not.

Q.3 Find minimum edit distance between “STALL” and “TABLE”.

Q.4. Classify give test statement using Naïve Bayes algorithm.

	docID	words in document	in c = China?
Training set	1	Chinese Beijing Chinese	yes
	2	Chinese Chinese Shanghai	yes
	3	Chinese Macao	yes
	4	Tokyo Japan Chinese	no
Test set	5	Chinese Chinese Chinese Tokyo Japan	?

Q.5 Find out pos tagging using Viterbi’s algorithm.

Book a car.
Park the car.
The book is in the car.
The car is in a park.