FINAL EXAM
SECOND SEMESTER SESSION 2011/2012

COURSE CODE / NAME : STIN3033 NATURAL LANGUAGE PROCESSING
DATE : 20 JUNE 2012 (WEDNESDAY)
TIME : 2.30 – 5.00 PM (2 ½ hours)
VENUE : DSB K. TM

INSTRUCTION :

1. This exam paper contains EIGHT (8) questions in SECTION A and THREEE (3) questions in SECTION B in ELEVEN (11) printed pages, excluding the cover page.
2. Answer ALL QUESTIONS on the space provided.
3. You are NOT ALLOWED to remove the exam paper from the examination hall.

MATRIC NO : ________________________________ (with word) __________________________ (with number)
IDENTIFICATION CARD NO : __________________________
LECTURER : ________________________________
GROUP : ______ TABLE NO : ________________________________

DO NOT OPEN THIS EXAMINATION PAPER UNTIL INSTRUCTED

CONFIDENTIAL
STIN3033 Natural Language Processing

SECTION A: STRUCTURED QUESTIONS (50 MARKS)

1. Natural Language Processing (NLP) has some similarities and differences with other language processing. Discuss TWO (2) differences between NLP and Programming Language Processing (PLP).
   
   (4 marks)

2. Differentiate the following elements of Natural Language processing (NLP) by giving ONE (1) example of its usage.

   a) Syntax and semantic

   (6 marks)
b) Phonology and morphology

3. Discuss **TWO (2)** importance of Natural Language Processing (NLP).

   (4 marks)
4. State **TWO (2)** parsing methods and illustrate your answers with **ONE (1)** example for each method.  

   (4 marks)

5. Explain how parsing process relates to search strategy.  

   (4 marks)
6. There are some long sentences in Neural Networks module. The longest one consists of 15 words. To parse this sentence, values for constant c and k are set to 10 and 100 respectively.

   a) Calculate complexity for both search-based parser and chart-based parser using the assigned values.

      (4 marks)

   b) Based on the values calculated in (a), which parser is more efficient? Justify your answer.

      (4 marks)
c) There are some techniques that can be used to parse sentences efficiently. State two (2) of them.

(2 marks)

7. By using a suitable example, explain the differences between syntactic ambiguity and semantic ambiguity.

(4 marks)
8. By using a suitable diagram, discuss how a two-way communication in natural language occurs.  

(8 marks)
SECTION B: APPLICATION (50 MARKS)

1. Given a set of lexicon as follows:

\[
\begin{align*}
S & \rightarrow NP \ VP \\
NP & \rightarrow ART \ N \\
NP & \rightarrow ART \ ADJ \ N \\
VP & \rightarrow V \\
VP & \rightarrow V \ NP
\end{align*}
\]

the : ART
old : ADJ, N
man : N, V
cried : V

Trace a sentence “Time flies like an arrow” by using

a) top-down chart parser

(10 marks)
b) bottom-up chart parser (10 marks)
c) Draw a parse tree for both tracing in (a) and (b). Do you get the same parse tree? Explain your answer by giving your justifications.

(10 marks)
d) Compare both parsing techniques in (a) and (b). Which one is the best? Justify your answer.

(10 marks)
2. Choose **ONE (1)** popular application of Natural Language Processing. Discuss how the chosen application can be applied in **education** domain and helps to make our jobs easier.

(10 marks)