

EEN318  
Second Test  
29th November 2010

Puppies Strictly Forbidden

Who are you ?

\_\_\_\_\_

What is your student number?

\_\_\_\_\_

“I have neither given nor accepted any aid in this examination”: Sign

\_\_\_\_\_

Make no marks in these boxes			
Question	5	6	7
Value	49%	49%	2%
Score			

5.

List all the sorting algorithms you can think of\*.

For each:

- A.  
State its name.
- B.  
Give a short overview of how it works.  
This should be enough to make it clear that you know the differences between the algorithms, but should not involve any code.
- C.  
State its advantages and disadvantages.
- D.  
State under which circumstances (if any) it would be a good choice.

\*: hint - you know of at least two  $O(n \times \log n)$  algorithms, and at least three that are  $O(n^2)$ . You also know of at least one that is not considered "general purpose".





6.

A.

What is the purpose of a *Tokeniser* (or *Lexical Analyser*)?

Consider a very simple language. The only values that it has are 0 and 1, and the only operators that it provides are `and` and `or`. The two operators have the same priority and are evaluated from left to right. The only other things allowed in the language are parentheses ( ).

The grammar for the language is

$$\begin{aligned} \textit{simple} & ::= \underline{0} \mid \underline{1} \mid (\underline{\textit{expression}}) \\ \textit{expression} & ::= \textit{simple} ((\underline{\textit{and}} \mid \underline{\textit{or}}) \textit{simple})^* \end{aligned}$$

Somebody has already written a tokeniser which you may make full use of, and defined a tree node object for you, with a constructor:

```
struct node
{ int kind;
  int value;
  string name;
  vector <node *> sub;
  node(int k, int v=0, string n)
  { kind=k;
    value=v;
    name=n; } };
```

You may assume the existence of other basic methods, such as one for adding or inserting another pointer into to a node's "sub" vector.

B.

Write the two functions `parse_simple()` and `parse_expression()`, that read and create tree nodes to represent *simples* and *expressions*, according to the grammar.

C.

Rewrite the struct definition in plain C (ANSI C or C-99). Remember that vectors did not exist in C.





7.

What is the difference between a crocodile and an alligator?

- a. one is bigger than the other
- b. they are both the same size
- c. crocodiles do not like potatoes
- d. one back leg was both the same
- e. none of the above

Who discovered Christopher Columbus?

- a. America
- b. a Western route to India
- c. Viking settlers
- d. Magellan
- e. Vasco da Gama

Where do hippopotamusses generally build their nests?

- a. in mighty oak trees
- b. like an allegory on the banks of the Nile
- c. where angels fear to tread
- d. out of the ashes of broken dreams
- e. illustrate your answer