UNIVERSITI TUN HUSSEIN ONN MALAYSIA

PEPERIKSAAN AKHIR
SEMESTER I
SESI 2012/2013

NAMA KURSUS	:	STRUKTUR DATA
KOD KURSUS	:	DAT 20104
PROGRAM	:	2 DAT
TARIKH PEPERIKSAAN	:	OKTOBER 2012
JANGKA MASA	:	2 ½ JAM
ARAHAN	:	JAWAB **EMPAT(4)** SOALAN SAHAJA

KERTAS SOALAN INI MENGANDUNGI DUABELAS (12) MUKA SURAT

SOALAN DI DALAM BAHASA MELAYU

S1. (a) Huraikan konsep struktur data dalam pengaturcaraan C++.

(3 markah)

(b) Kenal pasti pengkompil.

(2 markah)

(c) Huraikan penuding.

Beri satu contoh bagaimana untuk mengisytiharkan penuding.

(3 markah)

(d) Senaraikan **DUA (2)** jenis data dalam C++. Berikan satu contoh setiap jenis data.

(4 markah)

(e) Bezakan tatasusunan dengan senarai berpaut.

(8 markah)

(f) Nyatakan **LIMA (5)** operasi dalam senarai pautan.

(5 markah)

S2. (a) Tulis algoritma isihan selitan.

(6 markah)

(b) Illustrasikan proses isihan selitan secara susunan menurun:
Senarai : 99 55 4 66 28 31

(6 markah)

```cpp
#include <iostream>
using namespace std;
int LinearSearch(const int *Array, const int Size, const int
ValToSearch)
{
  bool NotFound = true;
  int i = 0;

  while(i < Size && NotFound)
  {
          if(ValToSearch != Array[i])
                  i++;
          else
                  NotFound = false;

  }

  if( NotFound == false )
          return i;
  else
          return -1;

}

int main()
{
  int Number[] = { 67, 278, 463, 2, 4683, 812, 236, 38 };
  int Quantity = sizeof(Number) / sizeof(int);
  int NumberToSearch = 0;
  cout << "Enter the number to search: "; cin >> NumberToSearch;
  int i = LinearSearch(Number, Quantity, NumberToSearch);
  if(i == -1)
          cout << NumberToSearch << " was not found in the
          collection\n\n";
  else
  {
          cout << NumberToSearch << " is at the " << i+1;

      if( i == 0 )
          cout<< "st position of the collection\n\n";
      else if( i == 1 )
          cout<< "nd position of the collection\n\n";
            else if( i == 2 )
                  cout<< "rd position of the collection\n\n";
            else
                  cout<< "th position of the collection\n\n";

  }

  return 0;
      }
```

Aturcara 1

(c)   Tuliskan algoritma Aturcara 1.

(6 markah)

(d) Tunjukkan keseluruhan proses Aturcara 1 menggunakan gambarajah yang sesuai untuk mendapatkan paparan.
Anda perlu memilih mana-mana nombor untuk menyokong jawapan anda.

(7 markah)

S3. (a) Namakan **TIGA(3)** operasi timbunan.

(3 markah)

(b) Lengkapkan kelas dengan menulis semua definasi fungsi bagi timbunan.

```
class stack
{
    int data[10];
    int top;
public :
    stack(){top=-1;}
    void push();
    void pop();
}
```

(10 markah)

(c) Tuliskan fungsi di dalam kod C++ untuk melaksanakan operasi hapus bagi baris gilir.

(12 marks)

```
struct Node
{
    float U,V;
    Node *Link;
};
class QUEUE
{
    Node *Rear,*Front;
public:
    QUEUE(){Rear=NULL; Front=NULL;}
    void INSERT();
    void DELETE();
    ~QUEUE();
};
```

S4. Berpandukan rajah 1.0

(a) Nyatakan anak nod C.

(2 markah)

(b) Nyatakan ibubapa nod E

(1 markah)

(c) Nyatakan nenek moyang nod I

(3 markah)

(d) Nyatakan paras H.

(1 markah)

(e) Senaraikan semua nod dedaun bagi sub pepohon kiri.

(1 markah)

(f) Tuliskan semua nod dalaman bagi sub pepohon kanan.

(3 markah)

(g) Terangkan *Strictly Binary Tree* dan *Complete binary Tree*.

(6 markah)

(h) Illustrasikan penambahan pepohon dedua dengan menggunakan senarai nombor input

Senarai nombor input:
14 15 4 9 7 18 3 5 16 4 20 17 9 14 5 1

(8 markah)

S5. (a) Tentukan ADT.

(2 markah)

(b) Kenalpasti algoritma.

(2 markah)

(c) Tentukan *linear data structure*.

(2 markah)

(d) Kenalpasti pohon dedua.

(2 markah)

(e) Kenalpasti pembinaan pepohon struktur data yang paling sesuai.

(2 markah)

(f) Nyatakan **TIGA (3)** aplikasi untuk pepohon struktur data.

(3 markah)

(g) Tentukan kelas.

(3 markah)

(h) Dengan menggunakan metod yang manakan isihan adalah tidak mungkin? (*Insertion, Selection, Exchange, Deletion*). Terangkan jawapan anda.

(4 markah)

(i) Tentukan **LIMA (5)** bahagian dimana struktur data digunakan secara meluas.

(5 markah)

SOALAN DI DALAM BAHASA INGGERIS

Q1. (a) Describe the data structure concept in C++ programming.

(3 marks)

(b) Identify a compiler.

(2 marks)

(c) Describe a pointer.

Give an example on how to declare a pointer.

(3 marks)

(d) List **TWO (2)** data types in C++. Give one example of each data type.

(4 marks)

(e) Differentiate array and link list.

(8 marks)

(f) State **FIVE (5)** operations in link list.

(5 marks)

Q2. (a) Write insertion Sort algorithm.

(6 marks)

(b) Illustrate insertion sort process by descending order:
List: 99 55 4 66 28 31

(6 marks)

```cpp
#include <iostream>
using namespace std;
int LinearSearch(const int *Array, const int Size, const int
ValToSearch)
{
  bool NotFound = true;
  int i = 0;

  while(i < Size && NotFound)
  {
          if(ValToSearch != Array[i])
                  i++;
          else
                  NotFound = false;
  }

  if( NotFound == false )
          return i;
  else
          return -1;
}

int main()
{
  int Number[] = { 67, 278, 463, 2, 4683, 812, 236, 38 };
  int Quantity = sizeof(Number) / sizeof(int);
  int NumberToSearch = 0;
  cout << "Enter the number to search: "; cin >> NumberToSearch;
  int i = LinearSearch(Number, Quantity, NumberToSearch);
  if(i == -1)
    cout << NumberToSearch << " was not found in the
    collection\n\n";
  else
  {
    cout << NumberToSearch << " is at the " << i+1;

  if( i == 0 )
    cout<< "st position of the collection\n\n";
  else if( i == 1 )
    cout<< "nd position of the collection\n\n";
          else if( i == 2 )
              cout<< "rd position of the collection\n\n";
          else
              cout<< "th position of the collection\n\n";
  }

  return 0;
  }
```

Program 1

(c)   Write Program 1 algorithm.   (6 marks)

(d)   Show the entire program 1 process using appropriate diagram to get the output. You need to choose any number to support your answer.

(7 marks)

Q3.   (a)   Name **THREE (3)** stack operations.

(3 marks)

(b)   Complete the class with all function definitions for a stack

```
class stack
{
    int data[10];
    int top;
public :
    stack(){top=-1;}
    void push();
    void pop();
}
```

(10 marks)

(c)   Write a function in C++ to perform a DELETE operation in a dynamically allocated queue considering the following description:

(12 marks)

```
struct Node
{
    float U,V;
    Node *Link;
};
class QUEUE
{
    Node *Rear,*Front;
public:
    QUEUE(){Rear=NULL; Front=NULL;}
    void INSERT();
    void DELETE();
    ~QUEUE();
};
```

Q4. Refer to figure 1.0

    (a)   State node C's children.

                (2 marks)

    (b)   State node E's parent.

                (1 marks)

    (c)   State node I's ancestors.

                (3 marks)

    (d)   State the level of H.

                (1 marks)

    (e)   List all leaf node of a left sub tree.

                (1 marks)

    (f)   Write all the internal node of the right sub tree.

                (3 marks)

    (g)   Explains Strictly Binary Tree and Complete binary Tree.

                (6 marks)

    (h)   Illustrate the insertion binary tree using input list number.
           Input list of numbers:
           15 15 4 9 7 18 3 5 16 4 20 17 9 14 5 1

                (8 marks)

Q5. (a) Define ADT.

(2 marks)

(b) Identify an Algorithm.

(2 marks)

(c) Define linear data structure.

(2 marks)

(d) Define binary tree.

(2 marks)

(e) Identify the suitable efficient data structure in tree construction.

(2 marks)

(f) State **THREE (3)** application of tree data-structure.

(3 marks)

(g) Define a class.

(3 marks)

(h) Sorting is not possible by using which of the following methods? (Insertion, Selection, Exchange, Deletion). Explain your answer.

(4 marks)

(i) Define **FIVE (5)** the areas in which data structures are applied extensively.

(5 marks)

PEPERIKSAAAN AKHIR
FINAL EXAMINATION

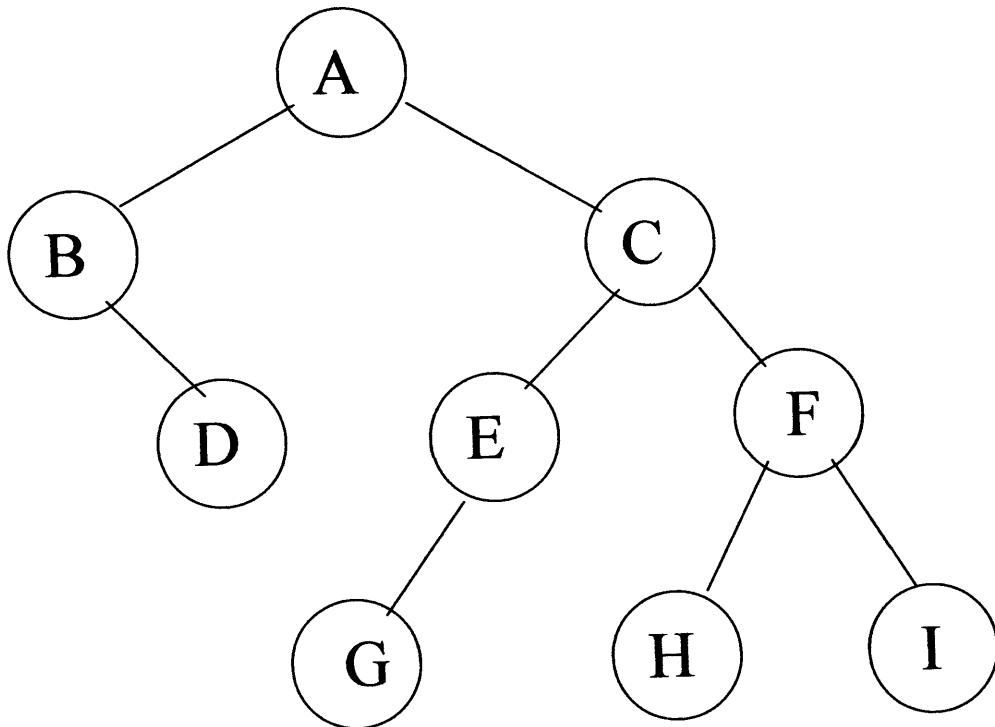|			
SEMESTER / SESI	: SEM I / 2012/2013	**PROGRAM**	: 2 DAT
SEMESTER / SESSION		*PROGRAMME*	
KURSUS	: DATA STRUCTURE	**KOD KURSUS**	: DAT20104
COURSE		*COURSE CODE*	

FIGURE 1.0: A BINARY TREE