UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2013/2014

COURSE NAME	:	OBJECT-ORIENTED PROGRAMMING
COURSE CODE	:	BIC20904
PROGRAMME	:	2 BIM/ 2 BIW/ 2 BIP/ 2 BIS
EXAMINATION DATE	:	DECEMBER 2013/JANUARY 2014
DURATION	:	2 HOURS AND 30 MINUTES
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **EIGHT (8)** PAGES

Q1 (a) What are the purposes of implementing constructor and destructor in a program?

(3 marks)

(b) Virtual functions are applicable to demonstrate the concept of polymorphism and dynamic binding.

(i) Determine the output of the program given in Figure **Q1(a)-Q1(d)**.

(3 marks)

(ii) Identify all classes and their corresponding virtual function(s) for the program in Figure **Q1(a)-Q1(c)**.

(6 marks)

(iii) Declare an array of pointer, named `ptr` of size three. Use the class in Figure **Q1(a)** to declare the array of pointer .

(2 marks)

(iv) Use the objects instantiated in **Q1(d)** to assign the address of the class in **Q1(a)** as the first element of `ptr`, the address of the class in **Q1(b)** as the second element of `ptr`, and the address of the class in **Q1(c)** as the last element of `ptr`.

(6 marks)

Q2 (a) Write a program segment for the following tasks.

(i) A `do...while` loop to count from 200 to 600 by 4s.

(4 marks)

(ii) A `while loop` to count from 200 to 600 by 4s.

(4 marks)

(b) A file named, `Ticket.dat` contains bus passengers' information as shown in Figure **Q2**.

(i) Write a programming statement to open the file, so that the information can be read as input.

(2 marks)

(ii) Write a looping statement to read all of the information from the file.

(10 marks)

Q3 (a) The program in Figure **Q3(a)** and **Q3(b)** contains errors. Find and fix the errors in the program. (Note: Your answer should indicate the line number of the error, description of the error, and correction.)

(10 marks)

(b) Design a test plan for the program. The test plan should contain at least **FIVE (5)** test cases and their expected output.

(10 marks)

Q4 (a) Define a structure called `Data` using `struct` statement. The members of `Data` should include information of Author, Publisher, and Publication Year of a book. Then declare `bookData` as a variable of the defined structure.

(10 marks)

(b) Declare class `Book` based on the class diagram given in Figure **Q4(b)**. Use the structure defined in **Q4(a)** to declare the attributes of the class.

(10 marks)

(c) Implement method `Add_at_Tail(Book newBook)` for the class in Figure **Q4(a)** to add new object at the end of a linked list.

(14 marks)

(d) Draw a diagram to show the content of the linked list after a book information is removed from the beginning of the linked list.

(4 marks)

(e) Name the programming concept demonstrated in **Q4(c)** and **Q4(d)**.

(2 marks)

- END OF QUESTION –

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```
//Filename : shape.cpp
class Shape{
   private:
      int width, height;
   public:
      void setValue(int w, int h);
      int getWidth();
      int getHeight();
      void displayResult(); };

void Shape::setValue(int w, int h){
      width = w;  height = h; };

int Shape::getWidth() {
      return width;};
```

FIGURE Q1(a)

```
//Filename : tria.cpp
#include "shape.cpp"

class Triangle: public Shape{
   public:
       void displayResult(); };

void Triangle::displayResult() {
 cout << "\nThe area of a Triangle is " << ((getWidth()*
getHeight())/2) << "\n"; };
```

FIGURE Q1(b)

```
//Filename : rect.cpp
#include "tria.cpp"

class Rectangle: public Shape {
   public:
       void displayResult(); };

void Rectangle::displayResult() {
 cout << "\nThe area of a Rectangle is " << (getWidth()*
getHeight()) << "\n"; };
```

FIGURE Q1(c)

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```
//Filename: mainDr.cpp
#include "rect.cpp"

int main() {
int x;
Shape shape;
shape.displayResult();

Triangle triangle;
triangle.setValue(2,9);
triangle.displayResult();

Rectangle rectangle;
rectangle.setValue(3,3);
rectangle.displayResult();

return 0;
};
```

FIGURE Q1(d)

IC Number	Passenger's Name	Departure Date	Departure Time
810221115678	Black	23/07/2013	0180
800705107896	Shae	20/08/2013	1800
820926048973	Perry	12/10/2013	1900
801011016751	Rihanna	11/07/2013	1520
801109012345	Sheila	12/07/2013	0830

FIGURE Q2

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```
1   //Filename : Multiply.cpp
2   //This program declares a class Multiply for multiplication of
3   two numbers
4   #include<iostream.h>
5   class Multiply {
6         private:
7               int x,y;
8         public:
9         int MultiplyNo();
10        void Result();}; //class Multiply
11
12  int Multiply::MultiplyNo() {
13        cout>>"Please enter a number.";
14        cin<<x;
15        cout>>"Please enter a number.";
16        cin<<y;
17        mul = x+y;
18        return mul;
19  }; //method MultiplyNo
20
21  void Multiply::Result() {
22        result = MultiplyNo();
23        cout<<"\n The result for the multiplication of x:" << x;
24        cout<< " and y: " << y;
25        cout<< " is " <<result;
26  };//method Result
```

FIGURE Q3(a)

```
1   //Filename: MutiplyDr.cpp
2   //This program servers as a driver (main) for class Multiply
3   #include <iostream.h>
4   int main(){
5         Multiply Multiply2No;
6         Multiplyof2No.Result();
7         return 0; };
```

FIGURE Q3(b)

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```
class BookList  {
      private:
            struct ListNode {
                  Book abook;
                  ListNode *next;
            };
            ListNode *head, *tail;
      public:
            BookList();
            int IsEmpty();
            void Add(Book newBook);
            void Remove();
            void DisplayList();
};

BookList::BookList() {
            head = NULL;  };

int BookList::IsEmpty() {
            if (head == NULL)
                  return 0;
            else
                  return 1;
};

void BookList::Add(Book newBook) {
            ListNode *newPtr = new ListNode;
            if (newPtr==NULL)
                  cout<<"Cannot allocate memory";
            else
            {
                  newPtr->abook = newBook;
                  newPtr->next=head;
                  head=newPtr;
            }
};
```

Figure Q4(a)

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Book
- Author - Publisher - Year
+ SetData() : void + GetData() : void

FIGURE Q4(b)

Lists of books			
	Author	Publisher	Year
1.	Mark	Rain	2011
2.	Aneesa	Sun	2012
3.	Maria	Light	2010
4.	Kelvin	Cahaya	2000
5.	Aina	Sinar	2007

FIGURE Q4(c)

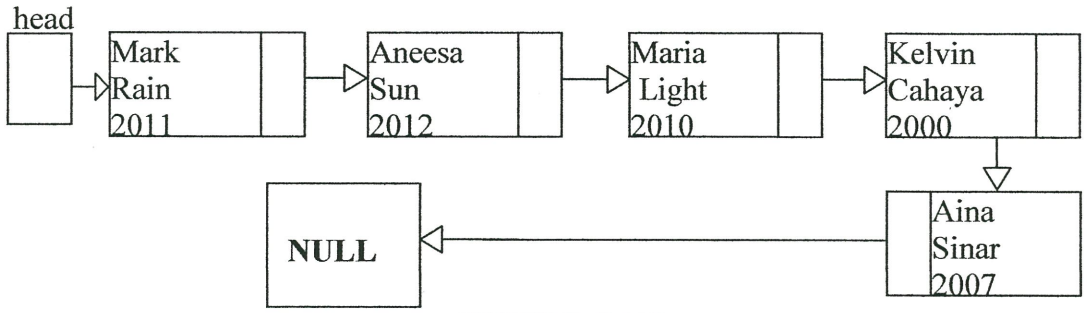

FIGURE Q4(d)