

CONFIDENTIAL



UNIVERSITI TEKNOLOGI MALAYSIA

MID TERM TEST

SEMESTER I 2017/2018

SUBJECT CODE	: SCSJ10123
SUBJECT NAME	: PROGRAMMING TECHNIQUE II
YEAR/COURSE	: 1 (SCSJ / SCSV / SCSB / SCSR / SCSD)
TIME	: (2 HOURS 30 MINUTES)
DATE	: 16th NOVEMBER 2017
VENUE	: N28 BK5

SOLUTIONS

QUESTION 1

[20 marks]

(a) (4 marks)

To provide different ways of creating an object. For example, the class `Ellipse` in Program 1 can also be used for creating a circle besides an ellipse.

Alternative answer: to make the class more programmer-friendly.

(b) (10 marks). 2m each.

```
// i.  
    Ellipse c1;  
    c1.setRadius(10,10);  
  
//ii.  
    Ellipse c2(10);  
  
//iii.  
    Ellipse c3(10,10);  
  
//iv.  
    Ellipse c4(0,0,10);  
  
//v.  
    Ellipse c5(0,0,10,10);
```

(c) (6 marks)

The program is unable to compile, i.e. a syntax error occurs (3m).

It is because the class has already had a method with two arguments of type `int`. (3m)

A method can only overloaded with different parameters (either number of parameters or type of parameters).

QUESTION 2**[20 marks]**

20 marks. 2m each line.

Line	Output
37	An object has been created with name Lim
39	An object has been created with name Rajoo
41	An object has been created with name Ahmad The person's name is Ahmad The object with name Ahmad is being deleted
43	The person's name is Rajoo
45	The person's name is Lim
47	The person's name is Rajoo
49	The object with name Rajoo is being deleted The object with name Lim is being deleted

QUESTION 3**[14 marks]**

1	#include<iostream>	
2	#include<cstdlib>	
3		
4	using namespace std;	
5		
6	class Operand{	
7	private:	
8	string value;	
9		
10	public:	
11	Operand(string _value=""){value=_value;}	
12	void setValue(string _value){value=_value;}	
13	string getValue() const {return value;}	
14	int stringToInteger(){return atoi(value.c_str());}	
15	};	
16		
17	int main()	
18	{	
19	// (a). Read the string of arithmetic expression from the keyboard and	
20	// store it in the variable expression.	(1 mark)
21		
22	string expression;	
23		
24		

```

25     cout <<"Enter an arithmetic expression, e.g. 20 + 30 => ";
26     getline(cin, expression); // 1m
27
28
29     // (b). Extract the operator and both operands from expression and store them
30     //      into the three different variables respectively. (3 marks)
31
32     string soperand1 = expression.substr(0,2); // 1m
33     string operation = expression.substr(3,1); // 1m
34     string soperand2 = expression.substr(5,2); // 1m
35
36
37
38     // (c). Create two objects of Operand and specify the value of each object with
39     //      the operand extracted in step (b) accordingly. (2 marks)
40
41     Operand operand1(soperand1);
42     Operand operand2(soperand2);
43
44     // (d). Convert the value of each operand from string to integer using the appropriate
45     //      method from the class Operand. (2 marks)
46
47     int value1 = operand1.stringToInteger(); // 1m
48     int value2 = operand2.stringToInteger(); // 1m
49
50
51     // (e). Determine the type of operation (i.e., either +, -, *, or /) and
52     //      perform the arithmetic calculation accordingly. (5 marks)
53
54     if (operation.compare("+") == 0) result = value1 + value2;
55     else if (operation.compare("-")==0) result = value1 - value2;
56     else if (operation.compare("*")==0) result = value1 * value2;
57     else result = value1 / value2;
58
59     // 4m
60
61
62     // (e). Print the result onto the screen. The output should look like below: (1 mark)
63     //      11 + 22 is 33
64
65     cout << expression << " is " << result << endl;
66
67     return 0;
68 }
69

```

QUESTION 4**[16 marks]**

(a) (2 marks).

To make a copy of a file to another.

(b) (8 marks). 2m each

Line(s)	Answer
20-21	To open two binary files for reading (input) and writing (output) respectively.
23-24	To get the size of the input file in bytes
26	To reset the file cursor to the beginning of the input file, as previous operations had moved the cursor to the end of the file
29-30	To read all data from the input file and write them back into the output file

(c) (2 marks).

The program can only work for an input file with a small size (i.e., maximum of 20,000 bytes) as the size of the array `data` is limited only to 20,000 bytes.

Alternative answer: If the size of the source file is larger than 20,000 bytes, only the first 20,000 bytes will be copied. As a result, the copied file won't be opened or read properly by the respective application.

(d) (4 marks).

```
char c; // 1m
for (int i=0; i<n; i++){ //1m
    fin.read(&c, 1); // 1m
    fout.write(&c,1); // 1m
}
// alternative answer
char c; //1m
while (!fin.eof()){ // 1m
    fin.read(&c, 1); // 1m
    fout.write(&c,1); // 1m
}
```

Remarks on the solution:

The existing code reads the input file all at once. The problem with this is that, we need to allocate the right amount of size for the array 'data'. The simplest solution is by setting the size the array to a very large value. However, the actual size of memory (RAM) is limited.

A better solution is by reading and writing the files a character at a time. And we do these processes in a loop for handle the entire files. That means, we only need one byte of character to store the read data.