LAB 1

| Question | Task | TIME ALLOCATION | REMARKs |
| --- | --- | --- | --- |
| 1 | cin and cout objects | 15 minutes |  |
| 2 | Simple C++ Programs to Implement Various Control Structures.   * *If* statements and *if-else if* * *switch* case statement and *do while* loop * *for* loop * *while* loop | 55 minutes |  |
| 3 | Pointers and arrays | 40 minutes |  |
| 4 | Function call by value | 10 minutes |  |

**Question 1**

1. Write a C++ program to display the following text.

Sales Report for September 15, 2010

Artist Title Price Genre Disc Sale

Merle Blue 12.99 Country 4% 12.47

Richard Music 8.49 Classical 8% 7.81

***Note: Lecturer to teach the solution using formatting manipulators.***

1. Given below is a complete program. Trace and write the output produced by the program shown below.

**#include<iostream>  
using namespace std;**

**int main()  
{ int x = 8, y = 2, z;**

**cout << ++x << endl;**

**cout << x << endl;**

**cout << x-- << endl;**

**cout << x + y << endl;**

**cout << x <<” “<< y << endl;**

**cout << "x \* x = ";**

**cout << x \* x << endl;**

**cout << y++ << endl;**

**z = x % y;**

**cout << z << endl;**

**return 0;**

**}**

1. Given below is an incomplete program. Complete the program based on the instructions given in the comments. Refer to sample program output given.

**#include<iostream>  
#include<iomanip>  
using namespace std;**

**int main()  
{   
 float day1, day2, total;**

**cout<<"Enter the sales for day 1 :" ;  
 cin>>day1;**

**//prompt user to enter the sales for second day**

**//calculate the total sales;**

**//display the sales figures with the total**

**return 0;**

**}**

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| **Sample Output Screen** |
| Enter the sales for day 1 : *25399.75*  Enter the sales for day 2 : *26536.88*  QTech Sdn Bhd Sales figures for 2 days  Day 1 : 25399.75  Day 2 : 26536.88  Total : 51936.63 |

**Question 2**

1. Write a C++ program that calculates and displays an employee’s total wages for the week. The regular hours for the work week are 40 and any hours worked over 40 are considered overtime. The employee earns RM18.50 per hour for regular hours, and RM24.35 per hour for overtime hours. The following pseudocode algorithm shows the program’s logic.

*DECLARE variables as required, set regular hours = 40, set overtime pay rate=24.35, set base pay rate = 18.50*

*GET user input for total hours*

*IF total hours greater than 40*

*overtime hours = total hours – regular hours*

*ELSE*

*overtime hours = 0*

*regular hours = total hours;*

*END IF*

*Regular wages = base pay rate X regular hours*

*Overtime wages = overtime pay rate X overtime hours*

*Total wages = regular wages + overtime wages*

*DISPLAY the total wages*

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| **Sample Output Screen 1** |
| Please enter total hours you've worked this week:*65*  Wages for this week are RM1348.75 |
| **Sample Output Screen 2** |
| Please enter total hours you've worked this week:*50*  Wages for this week are RM983.50 |

1. Write a complete program:
   * Prompt user to enter 10 numbers
   * Determine how many inputs are odd and even and display the total of all the numbers.
   * Incorporate do-while loop and selection structure in your solution.

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| **Sample Output Screen** |
| Enter a number :*2*  Enter a number :*2*  Enter a number :*3*  Enter a number :*4*  Enter a number :*1*  Enter a number :*4*  Enter a number :*6*  Enter a number :*2*  Enter a number :*2*  Enter a number :*2*  There are 8 even numbers and 2 odd numbers.  The total of all the 10 numbers are 28 |

1. Below is a full program solution. The program’s objective is to display the prediction of player’s future home location. The program will start by asking users to enter three locations they would like to be based at some day. It uses random numbers to predict their future. Observe the program solution and follow the instruction given in the comment in red.

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| **Sample Output Screen** |
| I am a fortune teller. Look into my crystal screen  and enter 3 locations you will possibly make as your permanent home. Example  Miami  Alor Gajah  Sydney  Then I will predict where your home will be in the future.  Enter future home 1 :*Melbourne*  Enter future home 2 :*Jakarta*  Enter future home 3 :*Ottawa*  Your home will be in Jakarta. |

**#include<iostream>  
#include<string>  
#include<ctime>  
#include<cstdlib>  
using namespace std;**

**int main()  
{ string location1, location2, location3;**

**int randomNum; //to hold the randomly generated integer**

**//"seed" the random generator**

**unsigned seed = time(0);**

**srand(seed);**

**cout<<"I am a fortune teller. Look into my crystal screen \n"**

**<<"and enter 3 locations you will possibly make as"**

**<<" your permanent home. \nExample \n\n"**

**<<" Miami \n Alor Gajah \n Sydney \n\n"**

**<<"Then I will predict where your home will be in the future.\n\n";**

**cout<<"Enter future home 1 :";**

**getline(cin, location1);**

**cout<<"Enter future home 2 :";**

**getline(cin, location2);**

**cout<<"Enter future home 3 :";**

**getline(cin, location3);**

**//randomly generate an integer between 1 and 4**

**randomNum = 1 + rand() % 4;**

**//Convert the if else to switch case**

**if(randomNum == 1)**

**cout<<"\nYour home will be in "<<location1<<".\n";**

**else if(randomNum == 2)**

**cout<<"\nYour home will be in "<<location2<<".\n";**

**else if(randomNum == 3)**

**cout<<"\nYour home will be in "<<location3<<".\n";**

**else**

**cout<<"\nSorry, your home will be in any of these locations.\n";**

**return 0;**

**}**

1. Refer to Q2c) full program. Modify the program to repeat the process 3 times using a ***for*** loop.
2. Write a complete C++ program based on the descriptions below:
   * Get user input for a number. The program will accumulate the inputs.
   * This process will be repetitive until user enter value 99 (Use a ***while*** loop).
   * After that, the loop will terminate and the total of all the inputs will be displayed.

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| **Sample Output Screen** |
| Enter a number :5  Enter a number :80  Enter a number :6  Enter a number :99  The total is 91 |

**Question 3**

1. What output will be displayed when this codes segment is executed?

**int a, b;**

**int \*p,\*q;**

**a = 20;**

**p = &a;**

**b = \*p%2 + 40;**

**q = p;**

**cout<<"a = "<<a<<endl;**

**cout<<"b = "<<b<<endl;**

**cout<<"\*p = "<<\*p<<endl;**

**cout<<"\*q = "<<\*q<<endl;**

1. Given the program output and incomplete program, complete it as required based on the instruction at the comments in red.

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| **Sample Output Screen** |
| Enter any sentence you wish and I will  display the sentence in uppercase.  *Mr.Jackie likes to play Sudoku and eat Thai food.*  MR.JACKIE LIKES TO PLAY SUDOKU AND EAT THAI FOOD. |

**#include <iostream>  
#include <string> // Needed to use string objects  
#include <cctype> // Needed for the toupper function  
using namespace std;  
int main()  
{ char ch;  
 int vowelCount = 0;  
 string sentence;  
 cout << "Enter any sentence you wish and I will \n"**

**<< "display the sentence in uppercase.\n";**

**getline(cin, sentence);**

**for (int pos = 0; pos < sentence.length(); pos++)  
 { // Uppercase a copy of the next character and assign it to ch**

**// Display ch**

**}**

**cout<<endl;  
 return 0;**

**}**

1. This program stores employee hours worked and hourly pay rates in two parallel arrays. Observe the program and the sample output. Complete it as required based on the instruction at the comments in red.

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| **Sample Output Screen** |
| Enter the hours worked and hourly pay rates of 5 employees.  Hours worked by employee #1: *10*  Hourly pay rate for employee #1: *2.40*  Hours worked by employee #2: *21*  Hourly pay rate for employee #2: *3.00*  Hours worked by employee #3: *12*  Hourly pay rate for employee #3: *20*  Hours worked by employee #4: *13*  Hourly pay rate for employee #4: *13*  Hours worked by employee #5: *19*  Hourly pay rate for employee #5: *1.00*  Here is the gross pay for each employee:  Employee #1: RM 24.00  Employee #2: RM 63.00  Employee #3: RM 240.00  Employee #4: RM 169.00  Employee #5: RM 19.00 |

**#include <iostream>  
#include <iomanip>  
using namespace std;**

**int main()**

**{ const int NUM\_EMPS = 5;**

**int index;**

**int hours[NUM\_EMPS]; // Define 2 parallel arrays**

**double payRate[NUM\_EMPS];**

**double grossPay;**

**// Get employee work data**

**cout << "Enter the hours worked and hourly pay rates of "**

**<< NUM\_EMPS << " employees. \n";**

**for (index = 0; index < NUM\_EMPS; index++)**

**{ cout << "Hours worked by employee #" << (index + 1) << ": ";**

**cin >> hours[index];**

**cout << "Hourly pay rate for employee #" << (index + 1) << ": ";**

**cin >> payRate[index];**

**}**

**// Display the data**

**return 0;**

**}**

1. Complete the C++ program:
   * Use a 2D array and initialize it with the values as the given table below.
   * Use nested for loops to output the values.

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| --- | --- | --- | --- |
| **Row index/**  **Column Index** | **[0]** | **[1]** | **[2]** |
| **[0]** | **21** | **4** | **12** |
| **[1]** | **8** | **45** | **12** |

|  |
| --- |
| **Sample Output Screen** |
| Row 1: 21 4 12  Row 2 : 8 45 12 |

**#include<iostream>  
#include<iomanip>  
using namespace std;**

**int main()  
{ int j, i;**

**//to complete**

**return 0;**

**}**

**Question 4**

1. Complete the program below (at segment labelled //to complete), by writing the function definition for area(…). The area of a circle is

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| **Sample Output Screen** |
| Enter a radius of a circle :*2.00*  Radius = 2 inches  Area of circle = 12.5664 square inches |

**#include <iostream>  
#include <cmath>  
using namespace std;  
const double PI = 3.14159;  
double area(double radius);   
 //Returns the area of a circle with the specified radius.**

**int main( )  
{   
 double radius, area\_of\_circle, volume\_of\_sphere;**

**cout << "Enter a radius of a circle :";**

**cin >> radius;**

**area\_of\_circle = area(radius);**

**cout << "Radius = " << radius << " inches\n"**

**<< "Area of circle = " << area\_of\_circle**

**<< " square inches\n";**

**return 0;**

**}**

**// to complete**

1. Below is an incomplete program. Complete the program as instructed.

**#include <iostream>  
using namespace std;   
int multi(int, int);**

**int main ()   
{ int number1, number2, ans;**

**//---------------(a)---------------------**

**cout << "\n "<<number1<<" \* "**

**<<number1<<" is " << ans << ".";**

**return 0;**

**}**

**//---------------(b)---------------------**

1. Write C++ statements to ask the user for TWO (2) numbers, and then call the function with the numbers as arguments.
2. Write C++ function (int multi(….)) that takes TWO (2) integer parameters, multiplies them together, and then returns the answer.

**~End~**