**Practical 2 – Refer to Topics 03 and 04**

**Part A (Understanding Concepts)**

1. Which of the following identifiers are valid? For the invalid ones, explain why they are invalid.
2. num
3. num2
4. 2dNum
5. 2d\_num
6. num#2
7. num-2
8. num 2
9. num\_2
10. \_num2
11. \_num\_2
12. Peter’s
13. int
14. monthly income
15. INCHES\_PER\_FOOT
16. What is the type (int, double, char, or string) of each of the following values?
17. -12.34
18. 23
19. 23.0
20. 's'
21. "H"
22. 'H'
23. "5.333333"
24. '#'
25. '5'
26. -29999
27. What is the output of the following program fragments? Use a symbol (e.g., ◘) to indicate a space for formatted number output e.g. ◘◘2.5.
28. int x;

x = 5;

cout << "x is " << setw(5) << x << endl;

x = x + 1;

cout << "x is now " << setw(5) << x;  
  
output: x is 5

x is now 6Press any key to continue . . .

1. double a, sum;

sum = 10.0;

cout << "sum = " << setw(5) << fixed << setprecision(2) << sum;

a = -0.001;

sum = sum + a;

cout << ", " << sum;

cout << ", " << setprecision(3) << sum;

output ans : sum = 10.00, 10.00, 9.999Press any key to continue . . .

1. double x;

int y;

x = 45;

y = 4.978;

cout << "x = " << fixed << setprecision(2) << x << endl;

cout << "y = " << setprecision(0) << y;

oa : x = 45.00

y =4Press any blah blah…

1. double w;

w = 2 / 5 + (double)3 \* 2.0 - 7;

cout << "w = " << fixed << setprecision(2) << w;

oa: w =-1.00Press any blah blah…

1. cout << "Tyre\tChecked\n" ;

cout << "Petrol\tChecked\n";

cout << "Proceed\tYes\n";

oa : Tyre Checked

Petrol Checked

Proceed Yes

Preess any blobla…

1. Write the following mathematical expressions as expressions in C/C++.
2.  ans: cout << "(a+b)/(a-b)" << endl; (b) 
3. cout << "(a+(b/c)/(d+(e/f)" << endl;
4. Design an algorithm using pseudocode for the problem of converting a given number of days into the equivalent number of weeks and days. For example, if the given number of days is 19, this is equivalent to 2 weeks and 5 days.
5. /\*
6. \* Converts days to week
7. \*/
8. #include <iostream>
9. #define DAYSINWEEK 7
10. using namespace std;
11. int main(void)
12. {
13. int days, weeks; //output
14. // get the days
15. cout << "Enter number of days: ";
16. cin >> days;
17. // convert to weeks
18. weeks = (days % 365) / DAYSINWEEK;
19. // remaining days
20. days = (days % 365) % DAYSINWEEK;
21. // wot
22. cout << "It is " << weeks << " weeks and " << days << " days.";
23. return 0;
24. }
25. Suppose you wish to implement the algorithm you wrote in question 5 by writing a C/C++ program. How would you use the preprocessor directive ‘#define’ (for a constant)?

**Part B (Programming Exercises)**

1. Refer to the algorithm you wrote for Part A question 5. Starting with the algorithm steps as comments in the program, complete the program for the problem.
2. The following program contains errors and is difficult to read.
3. Correct all the syntax errors.
4. Rewrite the program to improve the program style.
5. Run the program with different sets of numbers.
6. Run the program with the input numbers 3.0 and 0.0. What happens? Ans is infinity

#include <iotream>

#define ONE 1

int main(void)

{ Double num1,num2,num3;

cout << "Enter two numbers ";

cin >> num1 >> num2; num3 = num1 / num2 + one;

cout << "Answer is num3"; }

ans:

#include <iostream>

#define ONE 1

using namespace std;

int main(void)

{

double num1;

double num2;

double num3;

cout << "Enter two numbers ";

cin >> num1 >> num2;

num3 = num1 / num2 + ONE;

cout << "Answer is " << num3;

}

1. Implement the algorithm below. Use type double for numbers. Use the preprocessor directive ‘#define’ for the constant PI (*π*).

Algorithm

1. Get the radius of a circle.
2. Compute the area of the circle.

2.1 Area of a circle is *π* x radius2 where *π* is 3.14159.

1. Display the area of the circle.

#include <iostream>

#define PI 3.14159

using namespace std;

int main(void)

{

double radius;

double area;

cout << "Enter the radius ";

cin >> radius;

area = PI \* radius \* radius;

cout << "Answer is " << area;

}

4. Write a program that asks the user to enter two integer numbers and displays the result of the addition, subtraction, multiplication, division, and modulus of the two numbers. Include the following variable declarations in your program.

int num1, num2, add\_result, sub\_result, mul\_result, mod\_result;

double div\_result;

Make sure the division gives a real number result. [Hint: use casting to convert type integer to type double for the division.]

#include <iostream>

using namespace std;

int main(void)

{

int num1, num2, add\_result, sub\_result, mul\_result, mod\_result;

double div\_result;

cout << "enter first number ";

cin >> num1;

cout << "enter second number ";

cin >> num2;

add\_result = num1 + num2;

sub\_result = num1 - num2;

mul\_result = num1 \* num2;

mod\_result = num1 % num2;

div\_result = num1 / num2;

cout << "Addition = " << add\_result << endl;

cout << "Subtraction = " << sub\_result << endl;

cout << "Multiplication = " << mul\_result << endl;

cout << "Modulus = " << mod\_result << endl;

cout << "Division = " << div\_result << endl;

}

5. Write a program that asks the user to enter a temperature in degrees Celsius and converts it to degrees Fahrenheit. Formula for conversion to Fahrenheit:



where f is the Fahrenheit value and c is the Celsius value. Test your program with the Celsius value 100.0. The Fahrenheit value should be 212.0. A sample output is as follows, where the ◘ represents a blank space:

Celsius◘Fahrenheit

◘100.00◘◘◘◘◘212.00

#include <iostream>

#include <iomanip>

using namespace std;

int main(void)

{

double f, c;

cout << "enter temperature in celsius ";

cin >> c;

f = (c \* 9.0) / 5.0 + 32;

cout << "Celsius\tFahrenheit" << endl;

cout << " " << fixed << setprecision(2) << c << " " << f << endl;

return 0;

}

**Part C (Self-Review / Revision)**

1. What is the general form of a program?
2. What are the rules for identifiers?
3. What are 2 preprocessor directives used in a C/C++ program? What is the purpose of each of them?
4. What is a data type?
5. What happens when an arithmetic expression has both type int and double for its operands?
6. Explain how operator precedence is used to evaluate arithmetic expressions involving more than one operator.
7. State the associativity rule.
8. How do you convert the integer type value in the following assignment statement to a double type using the cast operator?

double y = -12345;

1. Describe 3 types of errors that you may encounter when developing or executing a program.
2. What are the steps for the software development method?
3. What is an algorithm?

**Part D (Practice Exercises)**

1. Write a program to get the height of the user in feet and inches and convert and display the height in centimetres, given that 1 foot is 12 inches and 1 foot is 30.48 cm.

#include <iostream>

#include <iomanip>

using namespace std;

int main(void)

{

double foot, inches, ht;

cout << "enter height in cm ";

cin >> ht;

foot = ht/30.48;

inches = ht/2.54;

cout << "foot = " << foot << endl;

cout << "inches = " << inches << endl;

return 0;

}

1. Write a program that converts and prints a user-supplied measurement in inches into feet, yards, meters, and centimetres, given the following:

1 foot = 12 inches

1 yard = 36 inches

1 meter = 39.37 inches

1 inch = 2.54cm

#include <iostream>

using namespace std;

int main(void)

{

double inch; //input

//output

double foot, yard;

double meter, cm;

//get inch extra baby

cout << "enter inches";

cin >> inch;

//compute no. of diff measurement

foot = inch / 12;

yard = inch / 36;

meter = inch / 39.37;

cm = inch \* 2.54;

//display

cout << foot << "inch in terms of foot\n";

cout << yard << "inch in terms of yard\n";

cout << meter << "inch in terms of meter\n";

cout << cm << "inch in terms of cm\n";

return 0;

}