


National University of Computer and Emerging Sciences, Lahore Campus

	Course Name:	Programming Fundamentals	Course Code:	CS
	Program:	CS	Semester:	Fall 2019
	Duration:	60 Minutes	Total Marks:	20
	Paper Date:		Weight	
	Section:	ALL	Page(s):	2
	Exam Type:	Sessional - I		

Student : Name: _____ Roll No. _____ Section: _____

Instruction/Notes: Solve the exam on this question paper. You may use rough sheets, but they must not be attached.

Problem 1 [5 pts] The following C++ code is designed to take an integer Number as input and it should compute and print total number of years, months, weeks and days, possible in this Number. Assume there are 365 days in a year and 30 days in a month.

For example, if the input number is **800**, then it should print,

In Number 800 there are 2 Years 2 Months 1 Weeks and 3 Days.

If the input number is **370**, then it should print,

In Number 370 there are 1 Years 0 Months 0 Weeks and 5 Days.

Unfortunately, the program is not working correctly. Identify the **logical errors** in the code below **by circling them**, and provide corrections in the corresponding line based on the above description.

code	Corrections (only)
y, m, w, d, a, number	
PRINT "Enter a Number: "	
INPUT number	
y = number / 365	
a = number / 365	
m = a / 30	
a = a % 30	
w = a % 7	
d = a % 7	
PRINT "In Number " , number , " there are "	
PRINT y , " Years " , m , " Months " , w , " Weeks and " , d , " Days."	

Problem 2 [5 pts] Give the output of the following code for different inputs of variable extra in the box provided.

```
extra = 0
READ extra;
if (extra < 0){
    PRINT "small"
}
else if (extra is 0){
    PRINT "medium";
}
else{
    PRINT "large";
}
```

extra	Output
2	
-38	
0	

Problem 3 [10 pts] Write a pseudo-code that prints the first n terms of the Tick-Tock series. The value of n is taken as input. The first 8 terms of the Tick-Tock series, i.e., for $n=8$ are as follows:

$$2 - 5 + 4 - 10 + 6 - 15 + 8 - 20$$


Can you guess the pattern? The odd terms are multiples of 2 and in increasing order (2, 4, 6, 8 etc.). The even terms are increasing multiples of 5 and in negative form. The terms are alternatively positive and negative. Nothing should be printed if the value of n is below 1.

For Example:

If the input is $n=5$, the pseudo-code prints: $2 - 5 + 4 - 10 + 6$

If input is $n=10$, the pseudo-code prints: $2 - 5 + 4 - 10 + 6 - 15 + 8 - 20 + 10 - 25$

National University of Computer and Emerging Sciences, Lahore Campus

	Course Name:	Programming Fundamentals	Course Code:	CS 118
	Program:	BS(CS)	Semester:	Fall 2020
	Duration:	90 Minutes	Total Points:	40
	Paper Date:	19/10/2020	Page(s):	9
	Exam Type:	Midterm-I	Section:	ALL

Registration No. _____

Instructions:

Calculators are not allowed

You might use extra sheets if needed.

General Hints:

1. Comparison of double/float type variables is exactly similar to int type variables
2. For arithmetic operators if one of the variable/value type is double/float and one is int then the answer is floating point value.

SHORT QUESTIONS

1. The following program segment has been written to print a simple message in case the input number is a **positive integer** and **contains exactly 5-digits** (not less than 5 or more than 5-digits). What condition should be written within the parenthesis so that the program segment works correctly? Please remember that you are not allowed to use any other variables or add any new instruction in the program segment. Just write the condition using the already declared variable(s).
- [3 Points]**

```
int num = 0;
cin >> num;
if(_____)

    cout<<" It is a five digit positive number";
else
    cout<<" It is not a five digit positive number";
```

WRITE YOUR ANSWER HERE

2. For each of the following program segments, specify the output it will produce when executed.

[8 = (1 + 1 + 1 + 1 + 1 + 1 + 1 + 1) Points]

Program Segment	Output
<pre>int z = 0; z = 27 / 4; cout << "z = " << endl<<z;</pre>	
<pre>int num = 4; if (num % 2 == 0) cout << num / 2; else cout << num * 4;</pre>	
<pre>int RollNo, rollno; RollNo = 5; rollno = 8; cout << "Roll No is " << rollno;</pre>	
<pre>int delta = 0, x =3; if(x % 2 == 1) delta = delta + x; x = x + 1; if(x % 2 == 0) delta = delta + x; x = x + 1; if(x % 2 == 0) delta = delta + x; cout << delta;</pre>	
<pre>switch(13/11) { case 1: cout << "One"; case 2: cout << "Two"; case 3: cout << "Three"; default: cout << "Default"; }</pre>	

Program Segment	Output
<pre>i = 5; j = 3; k = 7; if (i < j) { if (j < k) i = j; else j = k; } else { if (j > k) j = i; else i = k; } cout << "i = " << i << " j = " << j << " k = " << k << endl;</pre>	
<pre>int num = 56; if(num % 7){ cout<<"Number is divisible by 7\n"; } else{ cout<<"Number is not divisible by 7\n"; }</pre>	
<pre>int a = 30, b = 20, c = 10, d = 8; cout << ((a >=b) == (d > c)) << (c < a) << (b + c == a);</pre>	

3. Following program has been written to compute and display average of three numbers but it is not producing correct output. For example when we input numbers 1, 2 and 3 the program display 4 whereas the actual average is 2.

Suggest a simple change **in a single line** of the program that will correct this logical error.

You must also rewrite the **corrected line (only)** in the space provided below **[3 Points]**

```
#include<iostream>

using namespace std;

int main(){

    double num1, num2, num3, avg;
    cin >> num1;
    cin >> num2;
    cin >> num3;
    avg = num1 + num2 + num3 /3;
    cout << "The average of three numbers is "<< avg ;
    return 0;
}
```

YOUR ANSWER GOES HERE

4. Following program has some syntax errors. Identify all the syntax errors and write each line correctly so that the program compiles without errors **[6 Points]**

PROGRAM LINES WITH ERROERS	PROGRAM WITHOUT ERROR
#include<iostream>	
Using namespace std;	
int main()	
{	
integer TC , FH;	
cout << 'Temperature IN';	
cin << T;	
F << 9\5.0* T + 32	
COUt >> "Temperature OUT"	
<< F <endl	
Return 0;	
}	

WRITING C++ PROGRAMS

Problem No 1: [Currency Conversion]

[7 Points]

International travelers often need to convert some amount of money from currency into another. For example, a Pakistani traveler to Malaysia got his amount converted into US Dollars and Ringgit Malaysia. In Malaysia he needed more Ringgits so he got some of his US Dollars converted into Ringgits. The calculations for conversions are really simple but travelers are not typically good at math.

In this problem you are required to write a simple program that will take two inputs i) the amount to be converted ii) the rate of conversion, and then display the amount that the traveler must receive after conversion. The formula for conversion is

Target Amount = Amount multiplied by the **Exchange Rate**

Write a program in the space provided below where the marks will be awarded for

- Correct indentation. [1 Points]
- Using number of and correct type of variables. [1 Points]
- Correct inputs and input validation (amount and rate > 0) [2 Point]
- Correct calculations [2 Points]
- Correctly showing the answers and messages. [1 Points]

Write your program in the space provided on the next page

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Problem No 2: [BODY MASS INDEX CALCULATOR]**[13 Points]**

The **BMI** (Body Mass Index) is calculated using height (**measured in meters**) and weight (**measured in Kg**) of a person. A person with **BMI** of 25.0 or more is considered **overweight**, while the **healthy/normal range is 18.5 to 24.9** and a person with **BMI** less than 18.5 is considered **underweight**. The formula for computing BMI is

$$\text{BMI} = \text{weight} / \text{height}^2$$

Where the weight is in kilograms and height is in meters.

Write a program that can be used to compute the BMI of a person. Your program must input **weight** in **Kilograms** and **Height** in **centimeters**. Your program must convert the height into meters (1 Meter = 100 centimeters) and then use it to compute the BMI of the person using formula described above. The program **must display** a message indicating if the person is **underweight**, **overweight** or has **normal** weight. Marks will be awarded for

- Correct indentation. [2 Points]
- Using number of and correct type of variables. [2 Points]
- Correct conversions and calculations [4 Points]
- Correctly showing the answers and messages. [5 Points]

Write your program in the space provided on the next page

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