

CS-118 Programming Fundamentals (Cyber Security)

Serial No:

**Sessional I
Exam (Solution)**

Total Time: 1 Hour

Total Marks: 50

Thursday, October 15th, 2020

Course Instructor

Mr. Jawad Hassan

Signature of Invigilator

Student Name

Roll No

Section

Signature

DO NOT OPEN THE QUESTION BOOK OR START UNTIL INSTRUCTED.

Instructions:

1. Attempt on question paper. Attempt all of them. Read the question carefully, understand the question, and then attempt it.
2. Please read the complete paper before attempting any question and manage your time intelligently.
3. Additional sheet are provided for rough work at the end.
4. If you need more space, write on the backside of the paper and clearly mark question and part number etc.
5. After asked to commence the exam, please verify that you have **NINE (09)** different printed pages including this title page, one page for **ASCII table** (on page 8) and one **Rough page** at the end. There are total of **TWO (2)** questions.
6. Use permanent ink pens only. Any part done using soft pencil will not be marked and cannot be claimed for rechecking.
7. Use proper **indentation** while writing code and make sure that your code is legible and only **C++**. Failing to do so can cost you marks.

	Q-1	Q-2	Total
Marks Obtained			
Total Marks	35	15	50

Q. No. 1 [21 + 4 + 5 + 5 = 35]

a) Write the outputs following codes (All codes are syntactically Correct):

[3 X 7 = 21]

Run the following codes and Recheck the output

<pre>int main() { cout << setw(5) << '#'<< setw(5) << '#'; cout << endl; cout << setw(4) << '#'<< setw(4) << '#'; cout << endl; cout << setw(5) << '#'<< setw(5) << '#'; cout << endl; cout << setw(4) << '#' << setw(4) << '#'; cout << endl; return 0; }</pre>	<p style="text-align: center;"><u>Output:</u></p> <pre style="text-align: center; color: red;"># # # # # # # #</pre>
<pre>int main() { int a = 64, b = 15; a = a + b % 12; b = b / a + 10; b = b + 2 % 6; a = a / b + 12; cout << "\n1st Modified value : " << a; cout << "\n2nd Modified value: " << b; return 0; }</pre>	<p style="text-align: center;"><u>Output:</u></p> <pre style="text-align: center; color: red;">1st Modified value : 17 2nd Modified value: 12</pre>
<pre>int main() { int x = 12; int y = 3; double z = 5.5; int Num1 = sizeof(z / y * x / 2 * 10 + (y * x + 2) / z); cout << "\nThe value of Num1 is : " << Num1 << endl; int Num2 = z / y * x / 2 * 10 + (y * x + 2) / z; cout << "\nThe value of Num2 is : " << Num2 << endl; return 0; }</pre>	<p style="text-align: center;"><u>Output:</u></p> <pre style="text-align: center; color: red;">The value of Num1 is : 8 The value of Num2 is : 116</pre>
<pre>int main() { char a = 'A'; char b = 'a'; cout << (4 + a) << endl; cout << (5.5 + b); return 0; }</pre>	<p style="text-align: center;"><u>Output:</u></p> <pre style="text-align: center; color: red;">69 102.5</pre>
<pre>int main() { char ch = 'T'; cout << "\nOutput 1: " << ch + 5; ch = ch + 5; cout << "\nOutput 2: " << ch; return 0; }</pre>	<p style="text-align: center;"><u>Output:</u></p> <pre style="text-align: center; color: red;">Output 1: 89 Output 2: Y</pre>

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<pre>int main() { cout << sizeof(10) << endl; cout << sizeof("1") << endl; cout << sizeof("1000") << endl; return 0; }</pre>	<p><u>Output:</u></p> <p>4 2 5</p>
<pre>int main() { short alpha; alpha = 0b01110110; cout << "\nAlpha is assigned \r::: Binary value ::: "; cout << "\nValue of alpha = " << alpha; }</pre>	<p><u>Output:</u></p> <p>::: Binary value ::: Value of alpha = 118</p>

b) Convert the following mathematical expression into computing expression: [4]

$$S = ((\text{pow}(a, 1/p) + \text{pow}(b, 1/q))/2 * a^p) + 4 * p * q;$$

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[5]

[5]

Page 4 of 9

Q. No. 2 [5 + 5 + 5 = 15]

a) Consider the following code segment below:

[5]

```
int main()
{
    short X = 35; //Line 1
    X = -1 * X; //Line 2
}
```

i) Show value of X after *Line 1* execution on the 16-bit memory structure below:

X:

0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

ii) Show value of X after *Line 2* execution on the 16-bit memory structure below:

X:

1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

- b) Write a C++ program that asks user to enter a four-digit integer value. Your program should prints sum of first and last digits. [5]

Sample Executions of program:

1)

Enter a Four-Digit Integer: 1234
Sum of First and Last Digit is = 5

2)

Enter a Four-Digit Integer: 7532
Sum of First and Last Digit is = 9

//Many solutions exist but one solution is given below

```
#include <iostream>

using namespace std;

int main()
{
    /*C++ program that asks user to enter a four-digit integer value and prints sum of
    first and last digits*/

    int value;
    int digit1;
    int digit4;
    cout << "Enter a Four-Digit Integer: ";
    cin >> value;
    digit1 = value / 1000; //Separating first Digit from four digit value
    digit4 = value % 10; //Separating fourth Digit from four digit value

    cout << "\nSum of First and Last Digit is = " << digit1 + digit4;

    return 0;
}
```

- c) Write a C++ program to convert a cat's age in cat's years when age is taken input in Human's years. [5]

Note: For first two years, a cat's year is equal to 10.5 human years. After that, each cat year equals 4 human years.

Sample Execution of program:

Input a cat's age in human years: 15

The cat's age in cat's years is = 73

//Many solutions exist but one solution is given below

```
#include <iostream>
#include <iomanip>

using namespace std;

int main()
{
    int input_age;
    int age_calculated;
    cout << "Input a cat's age in human years: ";
    cin >> input_age;

    age_calculated = 2 * 10.5 + (input_age - 2) * 4; /*Expression for calculating
age calculated in cat's age*/

    cout << "Input a cat's age in human years: " << age_calculated;

    cout << endl << endl;
    return 0;
}
```

ASCII Table

Ascii	Char	Ascii	Char	Ascii	Char	Ascii	Char
0	Null	32	Space	64	@	96	~
1	Start of heading	33	!	65	A	97	a
2	Start of text	34	"	66	B	98	b
3	End of text	35	#	67	C	99	c
4	End of transmit	36	\$	68	D	100	d
5	Enquiry	37	%	69	E	101	e
6	Acknowledge	38	&	70	F	102	f
7	Audible bell	39	'	71	G	103	g
8	Backspace	40	(	72	H	104	h
9	Horizontal tab	41	)	73	I	105	i
10	Line feed	42	*	74	J	106	j
11	Vertical tab	43	+	75	K	107	k
12	Form feed	44	,	76	L	108	l
13	Carriage return	45	-	77	M	109	m
14	Shift in	46	.	78	N	110	n
15	Shift out	47	/	79	O	111	o
16	Data link escape	48	0	80	P	112	p
17	Device control 1	49	1	81	Q	113	q
18	Device control 2	50	2	82	R	114	r
19	Device control 3	51	3	83	S	115	s
20	Device control 4	52	4	84	T	116	t
21	Neg. acknowledge	53	5	85	U	117	u
22	Synchronous idle	54	6	86	V	118	v
23	End trans. block	55	7	87	W	119	w
24	Cancel	56	8	88	X	120	x
25	End of medium	57	9	89	Y	121	y
26	Substitution	58	:	90	Z	122	z
27	Escape	59	;	91	[	123	{
28	File separator	60	<	92	\	124	|
29	Group separator	61	=	93	]	125	}
30	Record separator	62	>	94	^	126	~
31	Unit separator	63	?	95	_	127	Forward del.

Rough Work

Best of Luck!!!