



FACULTY OF ENGINEERING

Test 1

First Semester of 2021/2022

COURSE NAME : COMPUTER PROGRAMMING

CODE : ENG 3202 / ECC 3005

**PROGRAMME : BACHELOR OF COMPUTER AND COMMUNICATION
SYSTEMS ENGINEERING WITH HONOURS**

LECTURER : DR. SITI BARIRAH AHMAD ANAS / MDM ROSLIZAH ALI

DATE : 30 NOVEMBER 2021 VENUE : ONLINE

TIME : 9.00 – 10.00 PM DURATION : 1 HOUR

INSTRUCTIONS :

1. Answer **ALL** questions. Answers have to be typed /written in the question paper.
(Jawab **SEMUA** soalan. Jawapan hendaklah ditaip/ ditulis di dalam kertas soalan.)
2. Upload your answers to PutraBLAST within the time allocated.
(Muat naik jawapan anda ke PutraBLAST dalam masa yang diperuntukkan).

Name : ALIFF NABIL IZZUDIN BIN BADRUL HISHAM

Matric No. : 210277 Programme : CCSE

Seat No. : - Signature : ALIFF

This paper consists of **8** pages including the front page

@ UPM All rights reserved

1. Indicate whether the following statements are True (T) or False (F) (10 marks)
 - (a) **Myname** and **myName** are two different variables in C++. (T)
 - (b) Pseudocode is a collection of instructions that the computer can understand. (F)
 - (c) Before execution, all C++ programs must be translated by an interpreter. (F)
 - (d) Examples of high-level languages are Lisp, Ada, R and Ruby. (T)
 - (e) The arithmetic logic unit performs arithmetic operations and detects the logical errors of a program. (T)
 - (f) Text editor is a systems software. (T)
 - (g) A program written in Python language is called a source program. (T)
 - (h) Logical errors occur at run-time. (T)
 - (i) The purpose of a header file, such as **<iostream>**, is to store a program's source code. (F)
 - (j) The operating system is the hardware that manages the overall operation of a computer system. (T)

2. State the final value of variable **num** in each of the following expressions. Show the complete workings to obtain your answer.
 (NOTE : answer without workings will not be given any marks.) (5 marks)
 - i)


```
num = ( 3 * 9 * ( 3 + ( 9 * 3 ) / 3 * 3 ) );
num = ( 27 ( 3 + ( 27 ) / 9 ) );
num = ( 27 ( 3 + 3 ) );
num = 243
```

 - ii)


```
num = ( 2945 % 100 ) / 10 % 10 ;
```

```
num = ( 2945 % 100 ) / 10 ;  
num=0
```

ii) `num = 10 + 5 > 5 && 2 < 1;`
`num = true && false;`
`num = false;`
`num = 0;`

iii) `num = 100 > 3 && 'a' > 'd';`
`num= true && false;`
`num=false;`
`num=0;`

iv) `num = (10 +14) / 2 * 3 || 6 - 2 % 7;`
`num = (24/6) || (6-2);`
`num = true;`
`num=1;`

3. Given the program below, answer the following questions:

```
int main()  
{  
    int num1 = 10;  
    int num2 = 10;  
    for (int j = 10; j >= -2; j-=3)    // A  
    {  
        if (j % 2 != 0)  
            num1 = num1 + 2;  
        else  
            if (j % 5 != 0)  
                num2 = num2 + 4;  
    } //B  
    cout << "num1 is : "<< num1 << "\n" << "and num2 is : " << num2;  
    return 0;  
}
```

- (i) Trace the program by filling in the values for **j**, **num1** and **num2** in Table 1 for each loop iteration. (3 marks)

Table 1

Iteration number	j	num 1	num2
1	10	10	10
2	7	12	10
3	4	12	14
4	1	14	14
5	-2	14	18

- (ii) What is the output of the program? (1 mark)

Num1 is 14 and num2 is 18

- (iii) Convert the **for** loop (from the line commented with A until the line commented with B) into a **while** loop. (3 marks)

```
int main(){

    int num1=10;
    int num2=10;
    int j=10;

    while (j>=-2)
    {

        if(j%2 !=0)
            num1 = num1+2;
        else
            if(j%5!=0)
                num2=num2+4;
            j-=3;
    }

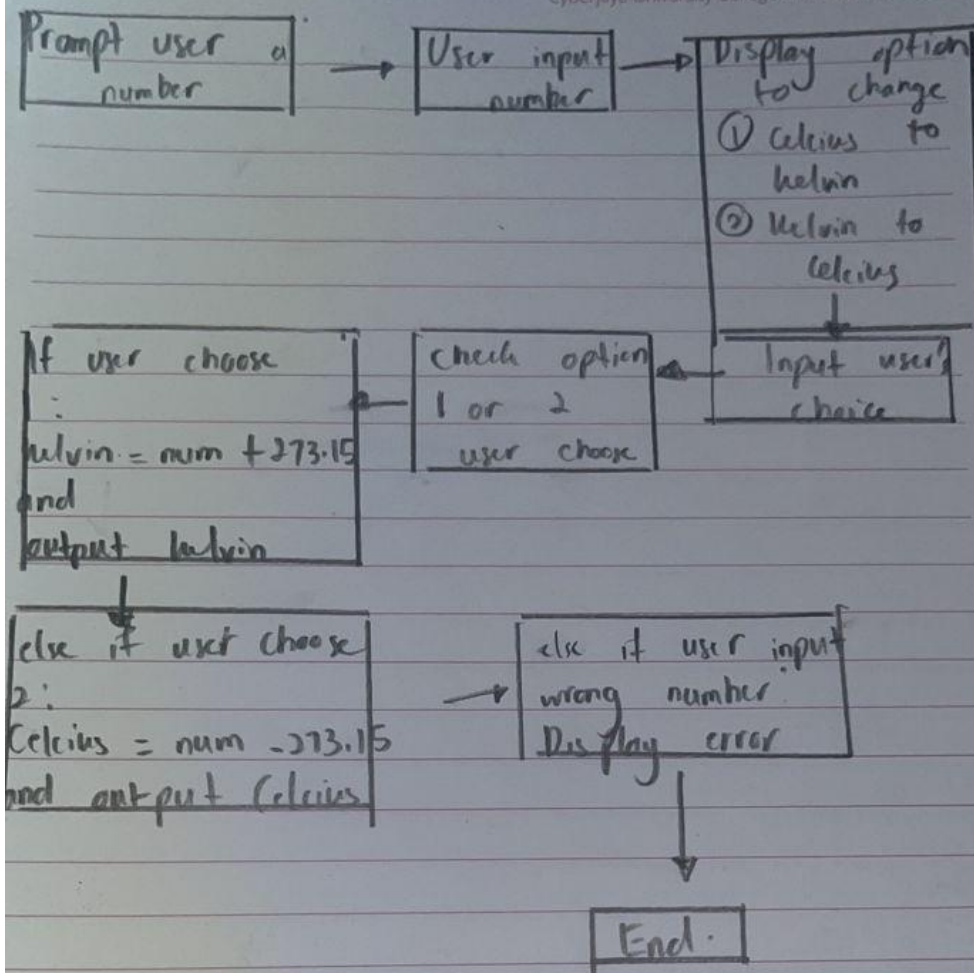
    cout << num1 << num2 << endl;

}
```

4. i) Convert the following algorithm into an equivalent flowchart to solve the problem. Draw the flowchart on the next page. (5 marks)

```
1. Start
2. Prompt user to enter an integer number
3. Input number
4. Ask user to choose from the following option
   1) Press 1: Celcius to Kelvin
   2) Press 2: Kelvin to Celcius
5. Input option
6. Check user's selection
   1) option == 1
      a) kelvin = number + 273.15
      b) Display Kelvin
   2) option == 2
      a) celcius = number - 273.15
      b) Display celcius
   3) otherwise
      a) Display invalid message
7. End
```

Flow chart



- ii) Explain TWO (2) differences between an algorithm and a flowchart. (2 marks)

Flowchart is a step-by-step representation of how a block of code is running which can be understood by humans while algorithms are a block of code which the computer understands and executes accordingly.

Flowchart is easier to detect and debug any errors since it is just a representation which shows the flow of a block of code while algorithm are more harder to detect and debug error since it is an implantation of the flowchart in programming language.

- iii) Write a complete C++ program to implement the flowchart using a **switch** statement. (NOTE : Submit the **.cpp** file for this section.) (7 marks)



test1.cpp

```
#include <iostream>

using namespace std;

int main(){

    int a,b,c;
    float output;

    cout << "enter an integer number : " << endl;
    cin >> a;

    cout << "What option do you want ? \t Press 1 : Celcius to Kelvin \t Press 2 : Kelvin to Celsius" << endl;
    cin >> b;

    if (b==1)
    {
        output = a + 273.15;
        cout << "Kelvin is :" << output << endl;
    }
    else if(b==2)
```



```

{
    output = a - 273.15;
    cout << "Celcius is :" << output << endl;
}
else
{
    cout << "----INVALID OPTION-----" << endl;
}



return 0;
}

```

- iv) Rewrite the **switch** statement in Question 4(iii) using nested **if-else** statements. (4 marks)
 (NOTE : you DO NOT have to write the whole program again)

ASCII table

<i>ASCII Value</i>	<i>Character</i>	<i>ASCII Value</i>	<i>Character</i>	<i>ASCII Value</i>	<i>Character</i>	<i>ASCII Value</i>	<i>Character</i>
0	NUL	32	(blank)	64	@	96	`
1	SOH	33	!	65	A	97	a
2	STX	34	"	66	B	98	b
3	ETX	35	#	67	C	99	c
4	EOT	36	\$	68	D	100	d
5	ENQ	37	%	69	E	101	e
6	ACK	38	&	70	F	102	f
7	BEL	39	'	71	G	103	g
8	BS	40	(	72	H	104	h
9	HT	41	)	73	I	105	i
10	LF	42	*	74	J	106	j
11	VT	43	+	75	K	107	k
12	FF	44	,	76	L	108	l
13	CR	45	-	77	M	109	m
14	SO	46	.	78	N	110	n
15	SI	47	/	79	O	111	o
16	DLE	48	0	80	P	112	p
17	DC1	49	1	81	Q	113	q
18	DC2	50	2	82	R	114	r
19	DC3	51	3	83	S	115	s
20	DC4	52	4	84	T	116	t
21	NAK	53	5	85	U	117	u
22	SYN	54	6	86	V	118	v
23	ETB	55	7	87	W	119	w
24	CAN	56	8	88	X	120	x
25	EM	57	9	89	Y	121	y
26	SUB	58	:	90	Z	122	z
27	ESC	59	;	91	[	123	{
28	FS	60	<	92	\	124	|
29	GS	61	=	93	]	125	}
30	RS	62	>	94	^	126	~
31	US	63	?	95	_	127	DEL

The first 32 characters and the last character are control characters. Usually, they are not displayed. However, some versions of C (some computers) support special graphics characters for these ASCII values. For example, 001 may represent the character , 002 may represent , and so on.

Operator Precedence and Associativity

Operators	Associativity
() [] -> . ++ (postfix) -- (postfix)	left to right
++ (prefix) -- (prefix) ! ~ sizeof(type) + (unary) - (unary) & (address) * (indirection)	right to left
* / %	left to right
+ -	left to right
<< >>	left to right
< <= > >=	left to right
== !=	left to right
&	left to right
^	left to right
|	left to right
&&	left to right
||	left to right
?:	right to left
= += -= *= /= *= >>= <<= &= ^= |=	right to left
, (comma operator)	left to right