

BITS Pilani - Dubai  
International Academic City, Dubai  
II- Semester 2007-2008

Course Number  
Course Name  
Nature of Component  
Weightage  
Max. Marks

TA UC 162  
Computer Programming - I  
Comprehensive Examination

Number of Pages : 5  
Sections : A, B, & C  
Number of Questions: 32

Duration : 180 minutes  
Date of Examination : 22.05.2008

Note: 1) Please follow all the instructions to candidates given on the cover page of the answer book.  
2) Use Separate Answer Book for each Section (A, B, & C).  
3) All parts of the question should be answered consecutively. Each answer should start from a fresh page.

SECTION - A

1. Why and when do we use #define directive (0.5Mark)
2. Why and when do we use #include directive (0.5Mark)
3. Distinguish between the following pairs (0.5x2=1Mark)
- a) main() & void main(void)
- b) int main() & void main()
4. Write a program that requests two float type numbers from the user & then divides the first number by the second & display the result along with the numbers. (1 Mark)
5. Identify syntax errors in the following program. Write the errors, and then write the corrected program, after corrections. What output would you expect when you execute it? (1Mark)

```
#define PI 3.14159
main ()
{
    int R, C;
    float perimeter;
    float area;
    C = pi;
    R = 5;
    perimeter = 2.0* C* R;
    Area = C*R*R;
    printf(“ %f”, % f, &perimeter, &area);
}
```

6. Declared a as int & b as float, state whether the following statements are TRUE or FALSE (0.25x 4=1Mark)

- a) The statement a= 1/3 + 1/3+1/3; assigns the value 1 to a
- b) The statement b= 1.0/3.0+1.0/3.0 +1.0/3.0; assigns the value 1.0 to b

- c) The statement `b= 1.0/3.0+2.0/3.0`; assigns the value 1.0 to b  
 d) The statement `a=15/10.0+3/2`; assigns the value 3 to a
7. Identify and rewrite the following arithmetic expressions by correcting the unnecessary Parenthesis, if any. (0.25x4=1Mark)
- `(( x-(y/5)+z)%8)+25`
  - `((x-y)*p)+q`
  - `(m*n)+(-x/y)`
  - `x/(3*y)`

8. In response to the input statement

```
scanf("%4d %* %d", &year, &code, &count)
```

The following data is keyed in:

```
19883745
```

What values does the computer assign to the variables year, code & count? (0.5Mark)

9. Write a program to read the following numbers, round them off to the nearest integer & print out the results in integer form

```
35.7  50.21  -23.73  -46.45 (1Mark)
```

10. Using an incorrect conversion code for data type being read or written will result in \_\_\_\_\_ error (0.5Mark)

11. According to the Gregorian Calendar , it was Monday on the date 01/01/1900. If any year is input through the keyboard , write a program to find out what is the day on 1<sup>st</sup> January of this year (2Mark)

12. What is an Operating system, give any 6 main features of Linux Operating System (0.5 + 1.5Mark)

13. What does the following command interpret (0.5x4=2Mark)

```
cd class/cs_108
pwd
ls -l
ls -a
```

### SECTION – B

1. What is the difference between an exit-controlled and entry-controlled loop. Explain it with a flow chart. ( 1 Mark)

2. Write a C program to read a number n, and get the following output:-

```
1
2  2
3  3  3
```

```

      4   4   4
      -
n     n   n       n times

```

The last line should print the number **n**, **n** times. (1.5 Marks)

- 3 Write a program to read the age of 100 persons and count the number of persons in the age group of 50 to 60. Use **for** and **continue** statements. (1.5 Marks)
- 4 What is a data structure? Why is an array called a data structure? (1 Mark)
- 5 Write a for loop to initialize all the left diagonal elements of an array to one and all other elements to zeros. Assume the array has 5 rows and 5 columns. (2 Marks)
- 6 What is the difference between reading a string using **scanf()** and using **gets()**? Given the following declarations in C

```
char address[10];
```

input line :- NEW YORK

What is the value assigned to **address** by each of the following two input statements.

```
scanf("%s",address); and gets(address); (2 Marks)
```

- 7 Write a C program using formatted output functions and for loops to print the following output for the string **CProgramming** left justified:-

```

C
CP
CPr
CPro
-----
-----
CProgrammin

```

**[Hint]** : The first output line with the first character of the string, the second output line with the first two characters of the string, the third output line with the first three characters and so on till the last line with all characters of the string. (2 Marks)

- 8 What are the two ways of passing parameters to a function call? (0.5 Mark)
- 9 Is it possible to make a called function in C to return multiple values to its calling place? If yes, how is it implemented? If no, why is it impossible? (1 Mark)
10. Develop a top down modular program to implement a calculator. The program should request the user to input two numbers and display one of the following as per the desire of the user:

(a) sum of the numbers.

(b) Difference of the numbers.

(c) Product of the numbers.

(d) Division of the numbers.

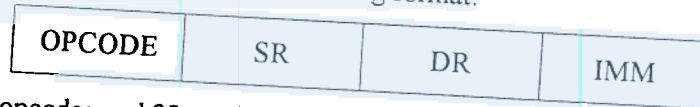
Use separate functions for each of the above. The main() should have only input statements and all function calls.

(1.5 Marks)

### SECTION – C

1. Suppose a 32-bit instruction takes the following format:

(3Marks)



If there are 75 opcodes and 32 registers:

- What is the minimum number of bits required to represent the OPCODE?
- What are the minimum number of bits required to represent SR and DR?
- What is the range of values that can be represented by the immediate (IMM)? Assume IMM is a 2's complement value.

2. A load to a memory uses a 14-bit address  $A[13:0]$  to obtain a 12-bit value  $V[11:0]$ . What is the total number of bits that can be stored in the memory? ( ½ Mark)

3. There is an LC-3 instruction that can be used to clear bits (i.e. set them to '0'). Write the instruction to clear the bits of register R1 and store the result in register R1. Write the answer in both machine language and in symbolic form. ( 1 Mark)

4. An assembly language LC-3 program is given below:

( 1 Mark )

```
.ORIG x3003
LEA R1, DATA
LDR R2, R1, #0
LOOP ADD R2, R2, #-3
BRzp LOOP
HALT
DATA .FILL x000C
.END
```

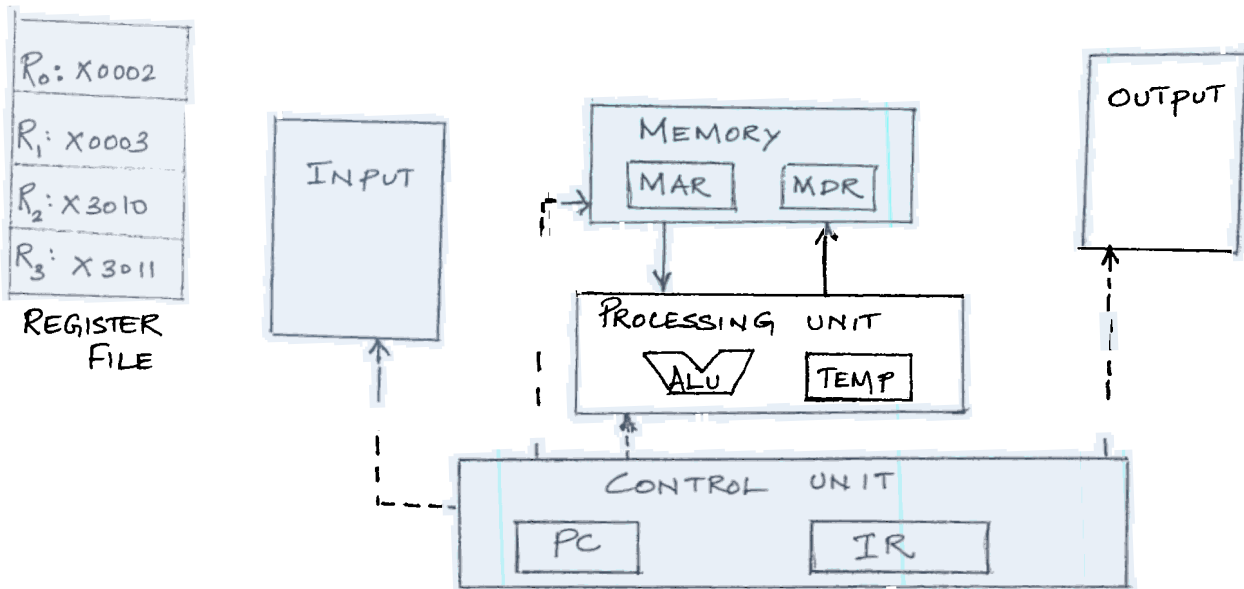
- Create a symbol table for the program.
- How many times will the instruction at the memory address labeled LOOP execute, if the R2 is 12?

5. Express the negative value -21 as a 2's complement integer, using eight bits. Repeat, using 16 bits. Repeat, using 32 bits. What does this illustrate with respect to the properties of sign extension as they pertain to 2's complement representation? ( ½ Marks)

6. What is the largest positive number one can represent in an 11 bit 2's complement code? Write your

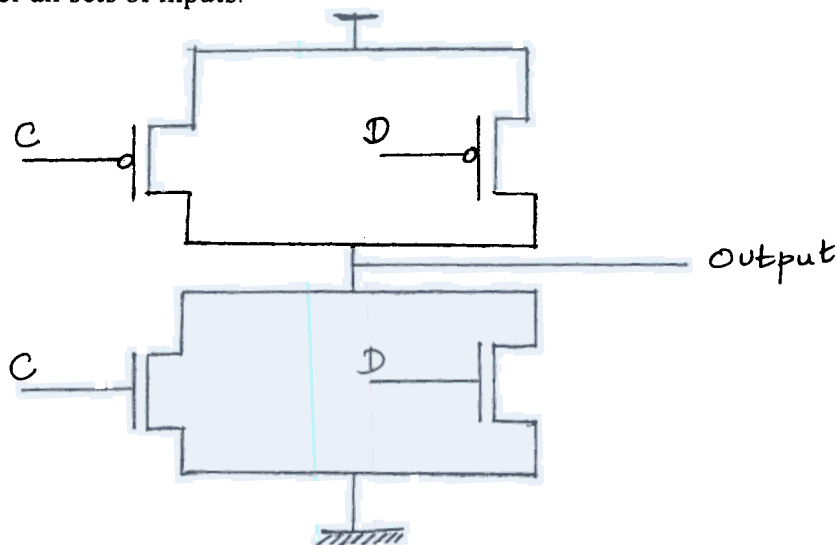
result in binary and decimal. What is the greatest magnitude negative number one can represent in an  $n$ -bit 2's complement code? Write your result in binary and decimal. What is the largest positive number one can represent in  $n$ -bit 2's complement code? What is the greatest magnitude negative number one can represent in  $n$ -bit 2's complement code? (2 Mark)

7. The figure below shows a block diagram of the Von Neumann model.



List the steps in writing a value x0003 to a location x3011 in the memory. Your steps should mention the MAR and MDR where applicable (1 Mark)

8. The circuit below has a major flaw. Can you identify it under what condition? Hint: Evaluate the circuit for all sets of inputs. (1 Mark)



9. The Decode phase of the Instruction Cycle always examines which part of the instruction? (1 Mark)

Course No.  
Course Name  
Nature of Component  
Date and Duration  
Weightage

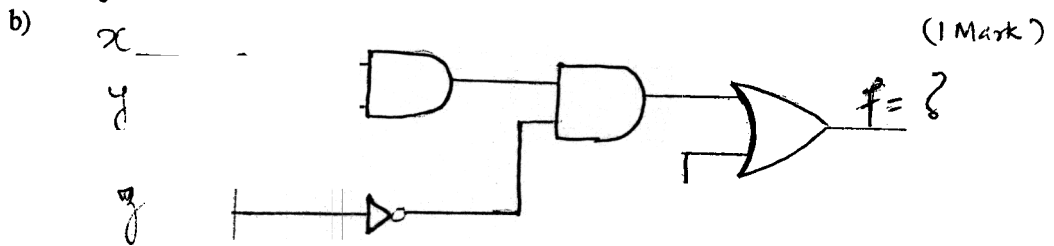
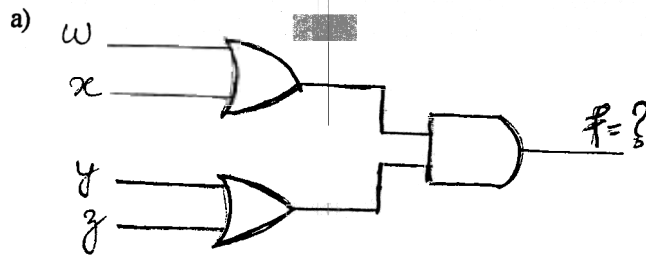
TA UC162  
Computer Programming - I  
Test - II ( Open Book )  
13-04-2008 (Sunday) & 50 mins  
20 % ( 20 Marks )

No. Sections: A, B & C  
No. Questions:  
No. of Pages:

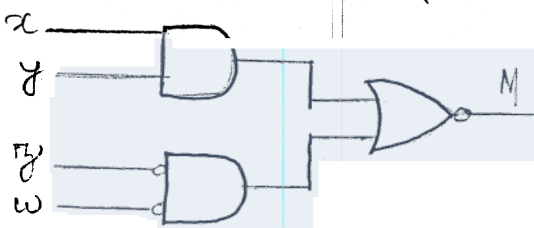
- Note: 1. Answer all Questions sequentially.  
2. Read the instruction and fill up the front page of the answer book.  
3. Text books and class notes are allowed but the **photocopy of the class notes are not allowed.**

**Section - A**

Analyze the symbolic logic circuits shown below and obtain their logic function for each circuit: (1 Mark)



2. Redraw the given logic circuit using <sup>only</sup> NAND gates. Substitute only equivalent signal lines and give its logic function. (1.5 Mark)



3. Construct a SR Latch using NOR gates and explain it with a truth / function table. (1 Mark)
4. Give the schematic level CMOS diagram for a three input AND gate, when the inputs are  $A=1$ ,  $B=1$ , and  $C=1$ . (1 Mark)
5. For the logic function given  $F = x_1.x_2 + x_3.x_4 + x_5$ , draw the combination logic circuit diagram. (1 Mark)
6. what is the format code used in the formatted output statement in a C source code, If I wants to print the hexadecimal integer without leading 0x; and to print a floating point value in exponent form. (1/4 Mark each)

## Section – B

- How does an array differ from an ordinary variable? (1 Mark)
2. Consider the following program segment.

```
main()
{
    char str[10];
    scanf("%s", str);
    printf("%s", str);
}
```

The error in the above program is

- a) Memory is not allocated for str.
  - b) Format control for str is not %s.
  - c) The parameter str to scanf() is passed by value. It should be passed by address.
  - d) None (no error in the given program segment). (1 Mark)
3. Write a suitable output statement inside a for statement that prints out the Character set A – Z. (2 Marks)
4. Given ASCII value of 'A' = 65, Will the following program segment execute successfully? If yes, what is the output? If no, give suitable reasons. (2 Marks)

```
#include<stdio.h>
main()

char ch='A';
switch(ch)

case 65:
    printf("65");
    break;
case 'A':
    printf("A");
    break;

}
```

## Section – C

1. What would be the output for the following (1Mark)

```
a) main()
{
    printf(" only stupids use C ?");
    display();
}
display()
{
    printf("fools too use C");
    main();
}
```

```
b) main()

int a=300,b,c;
if(a>=400)
    b=300;
c=200;
printf("%d %d", b, c);
}
```

2. Point out the errors if any

( 1 Mark )

a) main()

```
int j=10,k=12;
if(k>=j)
{
    {
        k=j;
        j=k;
    }
}
```

b) main()

```
{
message();
message();
}
message();
{
printf("PRAISE WORTHY & C WORTHY ARE SYNONYMS");
}
```

3. Fill in the blanks

( 1 Mark )

- a) By Default, \_\_\_\_\_ is the return type of C function.  
b) The \_\_\_\_\_ statement is used to skip a part of the statements in a loop

4. State whether True or False

( 1 Mark )

- a) The number of times a control variable is updated always equals the number of loop iterations.  
b) To return the control back to the calling function we must use the keyword **return**

5. Write a **for** statement to print the following

( ½ Mark )

1,2,4,8,16,32

6. Change the **for** loop to **while** loop

( ½ Mark )

```
for(m=1;m<10;m=m+1)
printf("m");
```

7. Distinguish between the following

( ¼ Mark each)

- a) Actual & Formal parameters  
b) Calling function & Called function  
c) global & local variables  
d) **&** and **\*** operator



**BITS, Pilani-Dubai**  
**International Academic City, Dubai.**  
**II Semester 2007-08**

Course No.	TA UC162
Course Name	Computer Programming – I
Nature of Component	Test - I ( Closed Book )
Date and Duration	24-02-2008 (Sunday) & 50 mins
Weightage	20 % ( 20 Marks )

<i>No. Sections: A, B &amp; C</i>
<i>No. Questions: 19</i>
<i>No. of Pages: 2</i>

- Note: 1. Answer all Questions sequentially.  
2. Read the instruction and fill up the front page of the answer book.

**Section – A**

1. The Underscore can be used anywhere in an identifier(TRUE or FALSE) (1 Mark)
2. A Programmer would like to use the word DPR to declare all the double-precision floating point values in his program. How could he achieve this? (1 Mark)
3. Find the Error in the following program segment? (1 Mark)

```
# define pi=3.14159
main()

    int R,C;
    float perimeter;
    float area;
    C= PI
    R=5;
    perimeter=2.0*C*R;
    area= C*R*R;
    printf("%f", "%d",&perimeter, &area);
}
```

4. What would be the value of x after execution of the following statements? (1 Mark)  

```
int x,y=10 ;
char z = 'a' ;
x = y+z ;
```
5. Write a program to read the price of an item in decimal form ( like 15.95) & print the output in paise (like 1595 paise) ( 2 Marks )

**Section - B**

6. Determine the value of the following C expressions:-
  - a)  $-1 + 2 * (3 - 4)$  ( ½ Mark )
  - b)  $-2 * -3/4 \%5 - -6 + 4$  ( 1 Mark )
7. Given the following declarations ( 1 Mark )

```
int i, j, k;
i = j = k = 1;
```

Find the value of **i** in the following statement.

```
i = -j --- -k;
```
8. Which of the following shows the correct hierarchy of arithmetic operators in C. ( ½ Mark )
  - a) ++, \* or /, + or -
  - b) ++, \*, /, + -
  - c) ++, /, \*, +, -

9. Given that **a** and **b** represent the two logical values ( 0 – False, 1 – True ). For different possible inputs of **a** and **b** complete the following table with the logical operators in C.

a	b	!a	!b	!a && !b	!a    !b
0	0				
0	1				
1	0				
1	1				

10. Using Conditional Operators write a C program to find the largest of three integers a, b and c ( 2 Marks )

### Section - C

11. Why do you want to add the following statement `#include <stdio.h>` in a C Program? What happens when the compiler encounters this statement at the time of compilation? ( 1 Mark )
12. Reading a single character can be done by using the `getchar()` function, what is the basic function you had come across that performs same as `getchar()`. ( ½ Mark )
13. Give the explanations for the following functions and what is the header file has to be used in a C Program?  
 a) `isdigit()`                      b) `islower()`                      c) `isspace()` ( 1½ Marks )
14. What is the meaning of the following statement ? ( ½ Mark )  
`putchar('\n');`
15. What do you mean by format string in a input statement? Give an example ( ½ Mark )
16. Explain the following C statement: ( 1 Mark )  
`scanf(" %5d %*d %d", &w, &u, &z);`  
 if the end-user inputs values for w, u, and z from the keyboard as  
 12345678 90 911
17. Whether the following statement will be compiled by your compiler or not? If your answer is Yes or No, give the proper justification. ( 1 Mark )

```
char name1[15];
int IdNo;

.....
scanf( " %d %5s ", IdNo, name1);

.....
```

18. What does the following statement do? ( ½ Mark )  
`scanf( " % ^ [ a .. z]", &phone_number);`

19. What is the output of the following program segment ? ( ½ Mark )  

```
int I = 7;
printf(" %d", I++ * I++);
```

\*\*\*\*\*