

# BITS, PILANI - DUBAI CAMPUS KNOWLEDGE VILLAGE, DUBAI

I Year - II Semester 2003 - 2004

Course Name : COMPUTER PROGRAMMING I  
Course No : TA UC162

## Comprehensive Exam

Date : 10-6-04      Duration : 3 Hrs      Max marks : 40      Weightage : 40%

Note : 1. Answer all questions  
2. Answer questions in a sequential manner, questions answered out of sequence will not be evaluated

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### PART A

Note : Each question in this section carries 4 marks

1. Explain the Von Neumann model with a neat fig taking the LC-2 as an example.
2. Explain how the C compiler is organized
3. The speed of a logic structure depends on the largest number of logic gates through which any of the inputs must propagate to reach an output. Assume that an AND, NOT and an OR gate all have a one gate delay for e.g. the propagation delay of a two input 2-1 decoder is two because some inputs propagate through two gates.
  - i) What is the propagation delay for a two input multiplexor
  - ii) What is the propagation delay for a one bit full adder
  - iii) What is the propagation delay for a four bit full adder
  - iv) What is the propagation delay for a 32 bit full adder
4. Do the following Number conversions
  - i) Convert  $(120)_8$  to binary
  - ii) Convert the following binary numbers into octal and to hexadecimal  
1100001100111111
  - iii)  $(10)_{10} = (12)_x$
5. Write a C program to sort a list of strings alphabetically, use a function to read in the strings, and also a function to reorder the strings. The string END will indicate end of input.

6. Write a C program to generate every  $n^{\text{th}}$  integer, beginning with  $n_{\text{start}}$  (i.e.  $i=n_{\text{start}}, n_{\text{start}}+n, n_{\text{start}}+2*n, n_{\text{start}}+3*n, \dots$ ) continue the looping process for all values of  $i$  that do not exceed  $n_{\text{stop}}$ . Compute the sum of all integers that are evenly divisible by  $k$ , where  $k$  represents some positive integer.

### PART - B

7. What would be the output of the following program segment: (1 Mark)

```
main()
{
    int i=-4, j, num;
    j=(num< 0 ? 0 : num*num);
    printf("\n %d", j);
}
```

8. In the following C program statement  $b=6.6/a+(2*a+(3*c)/a*d)/(2/n)$ ; Which operation will be performed first?  
 (i)  $6.6/a$       (ii)  $2*a$       (iii)  $3*c$       (iv)  $2/n$  (1 Mark)
9. The expression  $x=4+2\% -8$  evaluates to  
 (i) -6      (ii) 6      (iii) 4      (iv) none of the above (1 Marks)
10. Point out the **errors**, if any, in the following program segment: (2 Marks)

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

11. What is the output of the following C program segment:

```
main()
{
    int k, num = 30;
    k = (num > 5 ? ( num <= 10 ? 100 : 200 ) : 500 );
    printf( "\n %d", num );
}
```

( 1 Mark )

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Computer Programming 1 TA UC 162 Test - II (open Book)

Duration : 50 Mins Max marks : 20 Weightage : 20% Date : 23-5-04

**Note :** 1. Only reference Book and Text books are allowed.  
2. Answer all questions

1. Write a program to read two unsorted arrays and then merge the two arrays such that the merged array is sorted
  - a. Use a function to read the arrays
  - b. Use a function to sort the arrays
  - c. Use a function to merge the arrays
  - d. Use a function to display the sorted array

6 marks (1 + 1 + 3 + 1)

2. Select the appropriate answer ( only one)
  - a. A program that runs on one machine but produces machine code for another machine is called a
    - i) simulator
    - ii) emulator
    - iii) cross assembler
    - iv) boot strap loader
  - b. The program counter is
    - a register
    - a cell in ROM
    - is the table entry in the variable table
    - a counter used to control loops
  - c. A microprogram is a
    - i) a very small program
    - ii) a primitive form of macros used in assembly language
    - iii) a set of instructions indicating primitive operations of a system
    - iv) a program written especially for microcomputers
  - d. A subtractor is not present in a computer because
    - i) it is expensive
    - ii) not possible to be designed
    - iii) usually the adder can take care of subtraction
    - iv) none of the above
  - e. The three main components in a digital computer are
    - i) memory, I/O, DMA
    - ii) memory, ALU, CPU
    - iii) memory, CPU, I/O
    - iv) CPU, ALU, DMA

12. Break statement is used to exit from : (1 marks)

- (i) an if statement
- (ii) a for loop
- (iii) a Program
- (iv) the main() function

13. State which of the following is True or False, explain, why? (2.5 Marks)

- i) When the printf function is called it always begins printing at the beginning of a new line.
- ii) The Escape sequence `\n` when used in a printf format control string causes the cursor to position.
- iii) C considers the variables `number` and `NUMBER` to be identical.
- iv) The modulus operator (`%`) can be used only with integer operands.
- v) A C program that prints three lines of output must contain three printf statements.

14. Write four different C statements that each add 1 to integer variable x. (2 Marks)

15. Write a single C statement to accomplish each of the following: (2 Marks)

- i) Assign the sum of x and y to z and increment the value of x by 1 after the calculation.
- ii) Multiply the variable product by 2 using the `*=` operator.
- iii) Decrement the variable x by 1 then subtract it from the variable total.
- iv) Print the floating point value 3.14159 with three digits to the right of the decimal point. What value is printed?

16. Answer the following : (2.5 Marks)

- i) The elements of an array are related by the fact that they have the same \_\_\_\_\_ and \_\_\_\_\_.
- ii) The numbers used to refer to a particular element of an array is called its \_\_\_\_\_.
- iii) A \_\_\_\_\_ should be used to declare the size of an array because it makes the program more scalable.
- iv) A \_\_\_\_\_ allows the compiler to check the number, types, and order of the arguments passed to a function.

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COMPUTER PROGRAMMING 1 TAUC162

Quiz 1

Duration : 30 Mins

Max marks : 10

Weightage : 10%

SET A

Note : in questions 1 and 2 -- denotes one blank, -- denotes two blanks and so on

1. Given int i=12345,j=0xabcd9,k=077777  
Give the output for

```
printf("%-8d%-8x%-8o",i,j,k);
```

- a. ---12345 ---abcd9 ---077777
- b. 12345---abcd9---77777---
- c. 123 abc 777
- d. 12345 ---0xabcd ---077777

2. Given int i=12345,j=0xabcd9,k=077777  
Give the output for

```
printf("%+8d%+8x%+8o",i,j,k);
```

- a. 12345 ---abdc9 ---77777
- b. --+12345 ---abcd9 ---77777
- c. --+12345 --+abcd9 --+77777
- d. --+12345 --+0xabcd9 --+077777

3. Determine the value of the expression given that i = 8 and j = 5

$$2 * ((i/5) + (4*(j-3)) \% (i+j-2))$$

- a. 9
- b. 12
- c. 7
- d. 18

4. Determine the value of the expression given that i = 8 and j = 5

$i -= (j > 0) ? j : 0$

- a. 3
- b. 6
- c. 9
- d. none of the above

5. Determine the value of the expression given that  $i = 8$  and  $j = 5$

$!(i \leq j)$

- a. 0
- b. 1
- c. 5
- d. 7

6. 'C' programs are converted into machine language with the help of

- a. Interpreter
- b. Compiler
- c. Operating System
- d. None of the above

7. The expression  $a = 30 * 1000 + 2768$  evaluates to

- a. 32768
- b. -32768
- c. 113040
- d. 0

8. The expression  $x = 4 + 2 \% -8$  evaluates to

- a. -6
- b. 6
- c. 4
- d. None of the above

9. Which of the following shows the correct hierarchy in 'C'

- a. \*\*, \* or /, + or -
- b. \*\*, \*, /, +, -
- c. \*\*, /, \*, +, -
- d. / or \*, - or +

10. Which of the following is not a character constant

- a. 'Thank you'
- b. 'Enter values for P t and R'
- c. '23.56E-03'
- d. All the above

11. In vi Editor, the command **xndd** is used to
- a. Deletes current line and copies it to a buffer name x.
  - b. Deletes n lines from current line and copies them to a buffer named x.
  - c. Deletes n words from current cursor position and copies them to a buffer named x.
  - d. None of the above.

12. In vi Editor the command **:set nonu** is
- a. Set auto indent off
  - b. Set display mode in which we are working
  - c. Set the display of line number off
  - d. Set auto indent on.

13. The Linux command **\$vi +100filename**, represents
- a. Loads the file and places cursor on the 100<sup>th</sup> line in the file.
  - b. Loads 100 files of the current working directory
  - c. Loads 100 words of the file
  - d. Displays the file in the read-only mode.

14. What single logic Gate satisfy the given Logic expression NOT(NOT(A)ANDNOT(B)) if the inputs for A and B are:

A	B	output
0	0	
0	1	
1	0	
1	1	

- a) NOT      b) OR      c) NOR      d) X-OR

15. Which of the following gates are Universal Gates:

- a) AND & NAND    b) OR & NOR    c) EX-OR & NOT    d) NAND & NOR

16. A Multiplexer is a

- a. One input and One output device
- b. Many inputs and One output device
- c. One input and Many outputs device
- d. Many inputs and Many outputs device

17. The algebraic expression given :  $((A)' \text{ AND } (B)')$  is

- a) Associatively law
- b) Distributive law
- c) Turing Machine Law
- d) De Morgan's Law

18. The decimal notation of  $(249)_{16}$  is

- a. 789
- b. 585
- c. 230
- d. 970

19. The two complement notation of  $-(41)_{10}$  is

- a. 11001110
- b. 11010111
- c. 00110001
- d. 11100010

20. Find the Two's Complements form for the given Binary Number  $(10101010)$

- a) 10101010
- b) 11100101
- c) 01010110
- d) 00011011

\*\*\*\*\*ALL THE BEST\*\*\*\*\*



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COMPUTER PROGRAMMING 1 TAUC162

Quiz 1 (Closed Book)

Duration : 30 Mins

Max marks : 10

Weightage : 10%

SET B

Note : in questions 11 and 12 – denotes one blank, -- denotes two blanks and so on

1. In vi Editor, the command **xn** is used to
  - a. Deletes current line and copies it to a buffer name x.
  - b. Deletes n lines from current line and copies them to a buffer named x.
  - c. Deletes n words from current cursor position and copies them to a buffer named x.
  - d. None of the above.
2. In vi Editor the command **:set nonu** is
  - a. Set auto indent off
  - b. Set display mode in which we are working
  - c. Set the display of line number off
  - d. Set auto indent on.
3. The Linux command **\$vi +100filename**, represents
  - a. Loads the file and places cursor on the 100<sup>th</sup> line in the file.
  - b. Loads 100 files of the current working directory
  - c. Loads 100 words of the file
  - d. Displays the file in the read-only mode.
4. What single logic Gate satisfy the given Logic expression  $\text{NOT}(\text{NOT}(A)\text{ANDNOT}(B))$  if the inputs for A and B are:

A	B	output
0	0	
0	1	
1	0	
1	1	

- a) NOT      b) OR      c) NOR      d) X-OR

5. Which of the following gates are Universal Gates:

- a) AND & NAND   b) OR & NOR   c) EX-OR & NOT   d) NAND & NOR

6. A Multiplexer is a

- a. One input and One output device  
b. Many inputs and One output device  
c. One input and Many outputs device  
d. Many inputs and Many outputs device

7. The algebraic expression given :  $((A)' \text{ AND } (B)')'$  is

- a) Associativity law   b) Distributive law   c) Turing Machine Law   d) De Morgan's Law

8. The decimal notation of  $(249)_{16}$  is

- a. 789  
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9. The two complement notation of  $-(41)_{10}$  is

- a. 11001110  
b. 11010111  
c. 00110001  
d. 11100010

10. Find the Two's Complements form for the given Binary Number (10101010)

- a) 10101010   b) 11100101   c) 01010110   d) 00011011

11. Given `int i=12345,j=0xabcd9,k=077777`

Give the output for

```
printf("%-8d%-8x%-8o",i,j,k);
```

- a. ---12345 ---abcd9 ---077777  
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12. Given `int i=12345,j=0xabcd9,k=077777`

Give the output for

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printf("%+8d%+8x%+8o",i,j,k);
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- a. 12345 ---abdc9 ---77777
- b. --+12345 ---abcd9 ---77777
- c. --+12345 --+abcd9 --+77777
- d. --+12345 --+0xabcd9 --+077777

13. Determine the value of the expression given that  $i = 8$  and  $j = 5$

$$2 * ((i/5) + (4*(j-3)) \% (i+j-2))$$

- a. 9
- b. 12
- c. 7
- d. 18

14. Determine the value of the expression given that  $i = 8$  and  $j = 5$

$$i - = (j > 0) ? j : 0$$

- a. 3
- b. 6
- c. 9
- d. none of the above

15. Determine the value of the expression given that  $i = 8$  and  $j = 5$

$$!(i \leq j)$$

- a. 0
- b. 1
- c. 5
- d. 7

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- c. Operating System
- d. None of the above

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19. Which of the following shows the correct hierarchy in 'C'

- a. \*\*, \* or / , + or -
- b. \*\*, \*, / , + , -
- c. \*\*, / , \* , + , -
- d. /or \* , - or +

20. Which of the following is not a character constant

- a. ' Thank you '
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- c. '23.56E-03'
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\*\*\*\*\*ALL THE BEST\*\*\*\*\*

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COMPUTER PROGRAMMING 1

TAUC162

Test 1

Duration : 50 Mins

Max marks : 20

Weightage : 20%

Date : 11 - 4 - 04

Nature of Test : Closed Book

Answer all questions

1. a. Solve for x  
 $(128)_{10} = (332)_x$

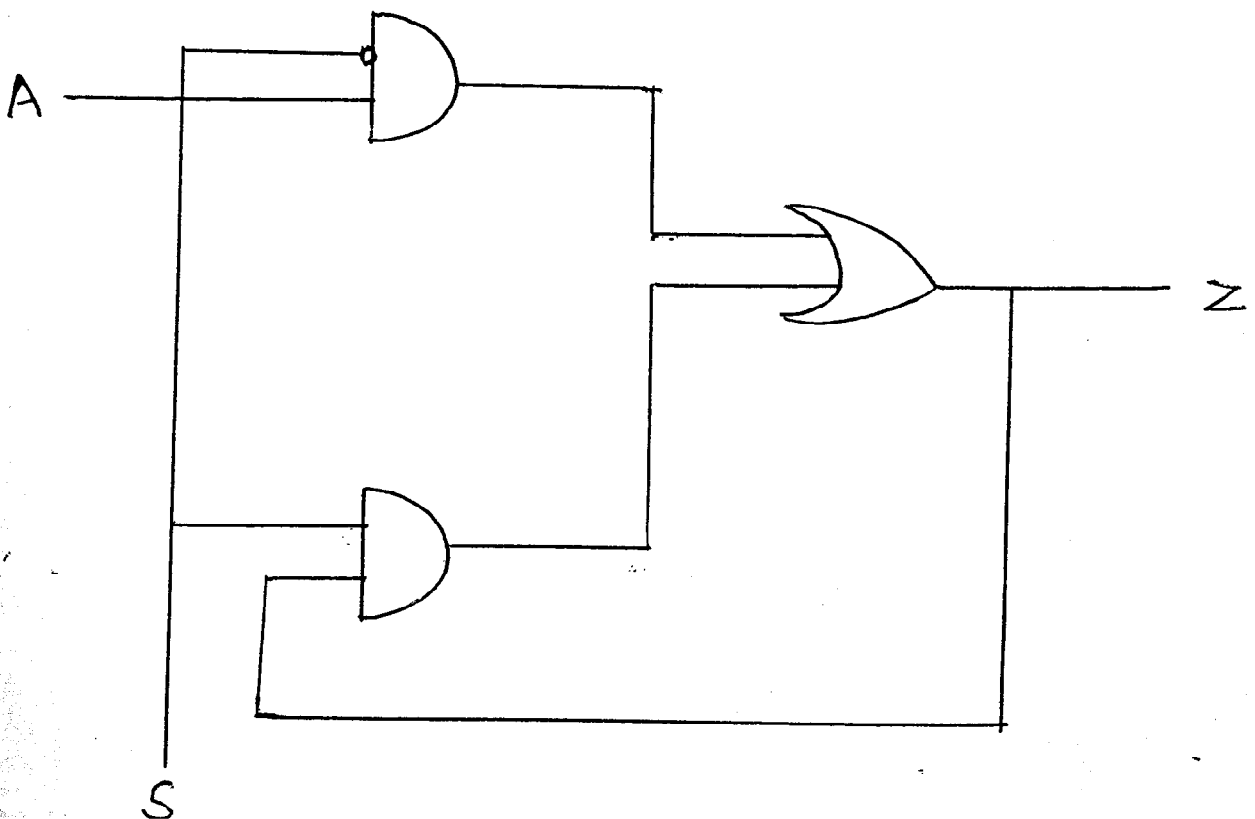
- 2 marks

b. Give the decimal equivalent of 1010110.000111 - 2 marks

c. Compute 26 -124 using binary arithmetic - 2 marks

2. Give the gate level description of the full adder along with the truth table - 3 marks

3. For the figure given below



**Note :** 1. Only reference Book and Text books are allowed.  
2. Answer all questions

1. Write a program to read two unsorted arrays and then merge the two arrays such that the merged array is sorted
  - a. Use a function to read the arrays
  - b. Use a function to sort the arrays
  - c. Use a function to merge the arrays
  - d. Use a function to display the sorted array

6 marks (1 +1 + 3 + 1)

2. Select the appropriate answer ( only one)
  - a. A program that runs on one machine but produces machine code for another machine is called a
    - i) simulator
    - ii) emulator
    - iii) cross assembler
    - iv) boot strap loader
  - b. The program counter is
    - a register
    - a cell in ROM
    - is the table entry in the variable table
    - a counter used to control loops
  - c. A microprogram is a
    - i) a very small program
    - ii) a primitive form of macros used in assembly language
    - iii) a set of instructions indicating primitive operations of a system
    - iv) a program written especially for microcomputers
  - d. A subtractor is not present in a computer because
    - i) it is expensive
    - ii) not possible to be designed
    - iii) usually the adder can take care of subtraction
    - iv) none of the above
  - e. The three main components in a digital computer are
    - i) memory, I/O, DMA
    - ii) memory, ALU, CPU
    - iii) memory, CPU, I/O
    - iv) CPU, ALU, DMA

f. 1 G (Giga) means

- i) 1 kilo-kilo
- ii) 1 mega-kilo
- iii) 1 mega-mega
- iv) none of the above

(0.5 X 6 = 3 marks)

3. Give short answers for

- a. A real time operating system is used in -----.
- b. A unix operating is an example of a ----- type of an operating system
- c. In the computer the bus is used as a -----.

(1 X 3 = 3marks)

4. What will be the output of the following program?

(2 marks)

```
#include<stdio.h>
main()
{
    int s[5][2]={
                {1234, 56}, {1212, 33},
                {1434, 80}, {1312, 78}
    };
    int i,j;
    for(i=1; i<2; i++)
    {
        printf("\n");
        for(j=0; j<=1; j++)
            printf("%d",s[i][j]);
    }
}
```

5. What will be output of the following program?

(3 marks)

```
#include<stdio.h>
main()
{
    int arr[]={ 'A', 'B', 'C', 'D' };
    int i;
    for(i=0; i<=3; i++)
        printf("\n%d", arr[i]);
}
```

6. Using arrays and string functions, write a C program to perform the following: (3 marks)

- a) To concatenate TWO strings which are stored in arrays `arr1` and `arr2` and store the Concatenated result in array `arr2`.
- b) To find the length of the TWO strings, and
- c) To Copy the concatenated string and store it in array named `arr3`.

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