

INTRODUCTION TO COMPUTING—2008

SEMESTER - 2

Time : 3 Hours

Full Marks : 70

1. Choose the correct alternatives for *any ten* of the following :

10 × 1 = 10

- (i) RAM stands for—
(a) Readwrite Access Memory (b) Read Access Memory
(c) Random Access Memory (d) None of these.
- (ii) Operatig system is—
(a) application software (b) system software
(c) both of these (d) None of these.
- (iii) ALU is a part of—
(a) memory (b) CPU (c) input device (d) output device
- (iv) The output of the following code is :
for (i = 1 ; 1 <= 5 ; i++)
{
 if i%2)
 continue ;
 printf (“%d”, i) ;
}
- (a) 1 2 3 4 5 (b) 1 3 5 (c) 2 4 (d) none of these.
- (v) The output of
int i = 5 ;
printf (“%d %d %d”, i, i++, ++i) ;
is—
(a) 5 5 7 (b) 5 6 7 (c) 7 6 5 (d) 7 6 6
- (vi) The output of—
#define SQ(x) x*x
void main ()
{
 int a, b ;
 a = 5 ;
 b = - SQ(a + 2) ;
 printf (“%d”, b) ;
}
- is—
(a) -49 (b) -17 (c) 7 (d) none of these.
- (vii) Which one of the following is a Bitwise operator?
(a) < (b) > = (c) << (d) &&
- (viii) The output of
fact = 1 ;

```

for (i = 1; i < 5; i++);
fact = fact*i
printf ("%d", fact);
is—

```

- (a) 24 (b) 5 (c) infinite loop (d) none of these.

(ix) The output of—

```

void main ( )
{
int arr [6] = {20, 25};
printf ("%d %d %d", arr [2], arr [3], arr [4]);
}
is—

```

- (a) 0 0 0 (b) 20 25 0 (c) 25 0 0 (d) none of these.

(x) The purpose of mode r+ is to—

- (a) open for only reading (b) open for only writing
(c) open for both reading and writing (d) none of these

(xi) Pointer is—

- (a) a variable containing the address of a variable (b) a value (c) a memory location
(d) none of these

(xii) A function may contain—

- (a) one return statement (b) two return statements
(c) more than two return statements (d) none of these

Ans. (i) c ; (ii) b ; (iii) b ; (iv) c ; (v) d ; (vi) c ; (vii) c ; (viii) b ; (ix) a ; (x) c ; (xi) a ; (xii) c.

Group-B

(Short Answer Type Questions)

3 × 5 = 15

Answer any three questions.

2. (a) What are the basic features of an algorithm? 1
(b) Write an algorithm to find largest among three numbers taken as input. 2
(c) What are the disadvantages of machine language? 2

Ans. (a) Refer Q. No. 3.(a) of 2003.

Ans. (b) Refer Q. No. 3.(b) of 2003.

Ans. (c) **Disadvantages of machine language** : All the instructions is represented by 0s and 1s in the machine language. It is very difficult to read, write and maintain. It is very time consuming.

Programming in machine code has one advantage over programming at other language levels—its execution is vey fast and efficient because the computer can accept the machine code as it is.

The disadvantages is, there is no one standard machine language. The languages are machine-dependent and the programs written in machine language for one computer model will not, in all likelihood, run on a different model computer. Although the machine language for a particular

computer is supplied by the manufacturer, few applications programs are written in machine languages.

3. With a suitable block diagram, briefly explain the major components and their functions of any conventional computer system.

Ans. Refer to Q. No. 3.(a) of 2002.

4. (a) Write a function power (a, b) to calculate the value of a raised to b.

- (b) What will be the output?

```
void fun (int*i, int*j) ;
main ( )
{
    int i = 5, j = 2 ;
    fun (&i, &j) ;
    printf ("\n%d %d", i, j) ;
}
void fun (int*i, int*j)
{
    *i = *i**i ;
    *j = *j**j ;
```

2 + 3

Ans. (a) The value a raised to b :

Program :

```
// By subhabrata Mandal
# include <stdio.h>
# include <stdlib.h>
# include <math.h>
# include <conio.h>
void main ( )
{
    int i, n ;
    double a, b, f, result = 1 ;
    printf ("\n Enter the value of A and B");
    scanf ("%lf%lf", &a, &b) ;
    i = (int) b ;
    f = fabs (b - i) ;
    i = abs (i) ;
    for (n = 1 ; n <= i ; n++)
        result* = a ;
    if (f > 0 && a < 0)
```

```

{ printf (“\n Floating point error!”);
  getch ( ) ;
  exit (0) ;
}
else
  if (x > 0)
    result* = exp (f* log (x)) ;
  if (y < 0)
    result = 1/result ;
  printf (“\n the result is % g”, result) ;
  getch ( ) ;
}

```

- 5. (a) What is dynamic memory allocation? 1
- (b) Write down the differences between malloc () and calloc (). 2
- (c) Write down the differences between structure and union. 2

Ans. (a) See Q. No. 2.(g) of 2006.

Ans. (b) See Q. No. 2.(g) of 2006.

Ans. (c) See Q. No. 4.(a) of 2005.

- 6. (a) What are the differences between recursion and iteration. 2
- (b) Write a recursive C function to calculate factorial of anumber. 3

Ans. (a) See Q. No. 9.(a) of 2006.

Ans. (b) See Q. No. 5. of 2006.

Group-C
(Long Answer Type Questions)

Answer any three questions

3×15 = 45

- 7. (a) Write down the differences between compiler and interpreter. 2
- (b) What is an operating system? Write down the basic features and operations of an operating system. 5
- (c) Perform the following operations : 4 × 2

Ans. (a) See Answer Q.No 2.(c) of 2003 and 3.(b) of 2005.

Ans. (b) Operating system : Operating system is a programs that runs on a computer to run other programs.

For the second part, see answers of the questions 2.(a) of 2002 and 2.(b) of 2003.

Ans. (c) (i) $(100110101)_2 = (?)_8$

$$\frac{100}{4} \frac{110}{6} \frac{101}{5} \therefore (100110101)_2 = (465)_8$$

$$(ii) (536)_8 = (?)_{16}$$

$$(536)_8 = \left(\frac{101\ 011\ 110}{5\ 3\ 6} \right) = (101\ 011\ 110)_2 = \frac{0001\ 0101\ 1110}{1\ 5\ 14} = (15E)_{10}$$

$$(iii) (23 \cdot 78)_{10} = (?)_2$$

$$\begin{array}{r} 2 \overline{) 23} \quad -1 \\ \underline{21} \\ 2 \overline{) 11} \quad -1 \\ \underline{10} \\ 2 \overline{) 5} \quad -1 \\ \underline{4} \\ 2 \overline{) 2} \quad -0 \\ \underline{2} \\ 0 \end{array}$$

$$(23)_{10} = (10111)_2$$

$$\cdot 78 \times 2 = 1 \cdot 56$$

$$\cdot 56 \times 2 = 1 \cdot 12$$

$$\cdot 12 \times 2 = 0 \cdot 24$$

$$\cdot 24 \times 2 = 0 \cdot 48$$

$$\cdot 48 \times 2 = 0 \cdot 96$$

$$\cdot 96 \times 2 = 1 \cdot 92$$

$$\cdot 92 \times 2 = 1 \cdot 84$$

$$\cdot 84 \times 2 = 1 \cdot 68$$

$$\cdot 68 \times 2 = 1 \cdot 38$$

integer part = 1

” ” = 1

” ” = 0

” ” = 0

” ” = 0

” ” = 1

” ” = 1

” ” = 1

” ” = 1

$$\therefore (78)_{10} = (110001111)_2$$

$$\therefore (23 \cdot 78)_{10} = (10111 \cdot 110001111)$$

$$(iv) (-7)_{10} - (7)_{10} = (10001)_2 - (00111)_2$$

1's complement of 00111 = 11000, 2's complement = 11001.

$$\therefore (10001)_2 - (00111)_2 = 010001 + 111001 = (001010)_2 = (10)_{10}$$

$\begin{array}{ccc} \uparrow & \uparrow & \uparrow \\ \text{signbit} & \text{signbit} & \text{signbit} \end{array}$

8. (a) Write a C program to find the largest and smallest among a list of n numbers taken as input. 5

(b) Write a C program to check whether a string taken as input is a palindrome or not. 5

(c) Write a C program to print the following pattern (till n rows, where n is taken as input). 5

```

1
2 3 2
3 4 5 4 3
4 5 6 7 6 5 4
```

Ans. (a) See Q. No. 5.(a) of 2003.

Ans. (b) Palindrome :

Program :

// By Subhabrata Mondal

include <stdio.h>

```

#include <conio.h>
#include <string.h>
void main ( )
{
    int i, s_len ;
    char str [30] ;
    printf (“\n Enter the string”) :
    gets (str) ;
    s_len = strlen (str) - 1 ;
    for (i = 0 ; i <= s_len/2 ; i++)
        if (str[i] != str [s_len - i])
            break ;
    if (i > s_len/2)
        printf (“\n The string is Palindrome”) ;
    else
        printg (“\n The string is not Palindrome”) ;
    getch ( ) ;
}

```

Ans. (c)

\\ By Subhabrata Mandal

```

#include <stdio.h>
#include <conio.h>
void main ( )
{
    int i, j, n ;
    printf (“\n Entier the rows number”)
    scanf (“%d”, & n) ;
    for (i = 1 ; i <= n ; i++)
    {
        for (j = 1 ; j <= n - i ; j++)
            printf (“d”) ;
        for (j = 1 ; j <= 2 × i - 1 ; j++)
            printf (“%d”, j) ;
        for (j = j - 2 ; j >= i ; j--)

```

```

printf ("%d", j);
printf ("\n");
}
getch ();
}

```

Another code :

```

for (i = 1 ; i <= n ; i++)
{
for (j = 1 ; j <= n - i ; j++)
printf ("b");
for (j = 1 ; j <= 2 * i - 1 ; j++)
printf ("%d", j + i - 1 - ((j - 1)/i)*(2*(j - 1)));
printf ("\n")
}

```

9. (a) Explain call by value and call by reference mechanism for passing arguments into a function a function call. Write a C function to swap the value of two integer variables passed as arguments. Also write the main function. 6
- (b) Define a structure called cricket that will describe the following information :
 Player name
 Team name
 Batting average
 Using cricket, declare an array player with 50 elements and write a program to read the information about all the 50 players and print the name of the player having highest batting average. 9

Ans. (a) See Q. No. 8.(a), (b) of 2003.

Ans. (b) Program :

\\ By Subhabrata Mondal

```
# include <stdio.h>
```

```
# include <conio.h>
```

```
# define size 50
```

```
void main ( )
```

```
{ struct cricket { char p_name [30], t name [20] ;
```

```
int avg ;
```

```
} p[size] ;
```

```
int i, max = 0 ;
```

```
printf ("\n Enter the information of % d players", size) ;
```

```

for (i = 0 ; i < size ; i++)
{   printf (“\n Enter % d Player’s Name, Team Name, Batting Average”, i + 1) ;
    gets (p[i] . p_name) ;
    fflush (stdin) ;
    gets (p[i] . t_name) ;
    fflush (stdin) ;
    scanf (“%d”, & p[i] . avg) ;
    fflush (stdin) ;
}
for (i = 1 ; i < size ; i++) if (p[max] . avg < p[i] . avg) max = i ;
printf (“\n % s has highest batting average % d”, p[max]. p_
name, p[max] avg) ;
getch () ;
}

```

10. (a) Write a C program that will receive a filename and a line of text as command line arguments and write the text to the file. 9
- (b) Write down the differences between while and do-while. 3
- (c) What is type casting? What is automatic type conversion? 3

Ans. (a) Program :

```

// By Subhabrata Mandal
# include <stdio.h>
# include <conio.h>
# include <stdlib.h>
void main (int argc, char * argv [ ])
{   FILE *fp ;
    int i ;
    if (argc < 3)
    {   printf (“\n Insufficient arguments”) ;
        getch () ;
        exit (0) ;
    }
    fp = fopen (argv [1], “w”) ;
    for (i = 2 ; i < argc ; i++)
        fprintf (fp, “% sb”, argv [i]) ;
}

```

```
fclose (fp);
```

```
getch ();
```

```
}
```

Ans. (b) See Q. No. 4.(c) of 2002.

Ans. (c) See Q. No. 4.(a) of 2006.

11. (a) What is the difference between iterative function and recursive function? 9

(b) Write a C program to find factorial of a number using iterative function as well as recursive function. $3 + (6 = 6)$

Ans. (a) **Recursive Function** : A function calls itself in its body, then the function is called recursive function. The recursive function has two conditions, first, the function must be written in a recursive form and second, the function must contains a stopping condition.

Iterative Function : At every iteration we call the function. The stopping condition depends on the iteration.

Ans. (b) **Factorial of a number :**

Iterative Function	Recursive Function
<pre>void main () { long i, n, f = 1, fact (long); printf ("Enter the number"); scanf ("%ld", &n); for (i = n; i >= 1; i--) f = f* fact (i); printf ("%ld", f); getch (); } long fact (long x) { return (x); }</pre>	<pre>long fact (long); void main () { long i, n; printf ("Enter the number"); scanf ("%ld", &n); printf ("The result is %ld", fact (n)); getch (); } long fact (long x) { if (x == 1) return (x); else return (x* fact (x - 1)); }</pre>