

Patuakhali Science and
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Course code CIT 111, 112

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Assignment : 01
Title : Chapter 2

Multiple Choice Questions

2.1 Which of the following characterize the typical features of C language?

- (a) high level
- (b) Machine independent
- (c) Structured
- (d) All of the above

Ans: (d) all of the above

2.2 A typical C program comprises the following sections:

- A - Documentation
- B - Definition
- C - Link
- D - main
- E - Subprogram section
- F - Global declaration

Identify the correct sequence of the C program sections:

Ans: A → C → B → F → D → E

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2.3 Which of the following types of errors are detected during the compilation?

- (a) Syntax
- (b) Logical
- (c) Data
- (d) All of those

Ans: (a) Syntax

2.4 Consider the following C statements:

A	a-b; x-1; z-a+x;
B	a-b; x-1; z-a+x;

Which of the above programming styles are correct in C?

- (a) A is correct, B is incorrect
- (b) A is incorrect, B is correct
- (c) Both A and B are correct
- (d) Both A and B are incorrect

Ans: (c) Both A and B are correct

2.5 C language comprises — number of keywords?

- (a) 32
- (b) 16
- (c) 64
- (d) 128

Ans: (a) 32

Review Questions

2.1

- (a) Every line in a C program should end with a semicolon.

Ans: True

- (b) The closing brace of the main() in a program is the logical end of the program.

Ans: True

- (c) Every C program end with an END word.

Ans: False

- (d) Comments cause the computer to print the text enclosed between /* and */ when executed.

Ans: False

- (e) A printf statement can generate only one line of output.

Ans: False

- (f) The purpose of the header file such as stdio.h is to store the source code of a program

Ans: True

A

(g) A line in a program may have more than one statement.

Ans: True

(h) Syntax errors will be detected by the compiler.

Ans: True

(i) In C language lowercase letters are significant

Ans: True

(j) main() is where the program begins its execution

Ans: True

(k) Every C program must have at least one user-defined function

Ans: False

(l) Declaration section contains instructions to the PC

Ans: False

(m) Only one function may be named main()

Ans: True

(n) Comments serve as internal documentation for programmers.

Ans: True

(o) In C, we can have comments inside comments.

Ans: False

(p) Use of comments reduces the speed of execution of a program

Ans: False

(q) A comment can be inserted in the middle of a statement.

Ans: True

2.2 Fill in the blanks with appropriate words:

(a) Every program statement in a C program must end with a ;

(b) The printf function is used to display the output on the screen.

(c) The math.h header file contains mathematical functions.

(d) The escape sequence character \n causes the cursor to move to the next line on the screen.

(e) C programs are written in lower case letters whereas uppercase letters are mainly used to define symbolic constants

(f) C language offers several built-in functions that can be used in a program by including the relevant header file.

(g) main() indicates the starting point of a C program.

2.3 Remove the semicolon at the end of the printf statement in the program of Fig 2.2 and execute it. What is the output?

Ans: Output is like,

<stdin>: 4: 13: error

expected ';' after expression

printf ("I see, I remember")
^ ;

1 error generated

2.4 In the sample program 2, delete line-5 and execute the program! How helpful is error message?

Ans: The error message is,

<stdin>: 7:1: error: use of undelared identifier

'number'

number = 100;

^

From this error we can get the idea of having an identifierless variable. So we can easily debug it.

2.5 Modify the sample program 3 to display the following output:

Year	Amount
1	5500.00
2	6160.00
—	—————
—	—————
10	14197.11

Ann: A lot of the following steps will be for.

in

/* Investment Problem */

#include <stdio.h>

#define PERIOD 10

#define PRINCIPAL 5000.00

/* MAIN PROGRAM BEGINS */

int main()

{ /* DECLARATION STATEMENTS */

int year;

float amount, value, inrates;

/* ASSIGNMENT STATEMENTS */

amount = PRINCIPAL;

inrate = 0.11;

year = 1;

/* PRINT Year and Amount */

printf("Year %.2f\nAmount",

/* COMPUTATION USING While loop */

while (year <= PERIOD)

{ printf("%2d %8.2f\n", year, amount);

value = amount + inrate * amount;

year = year + 1;

amount = value;

}

}

2.6 Why and when do we use the `#define` directive?

Ans: `#define` is used to define a global variable.
`#define` is used at the top of the file after declaring header files.

2.7 Why and when do we use the `#include` directive?

Ans: We use `#include` to point header files in C. They enable us to use built-in functions like `printf()`, `gets()`, `puts()`.

2.8 What does `void main(void)` mean?

Ans: `void main(void)` is the main function in C programming. Here `void` means nothing. So the main function will not take input and it also won't return anything. `main()` is mandatory function in C programming.

2.9 Distinguish between the following pairs

- (a) main() and void main(void)
- (b) int main() and void main()

Ans:

(a) main() is the main function of a C program. And void main(void) means it won't take any input and also won't return anything.

(b) int main() is a main function where main function will return an integer. Like return 0; On the other hand void main(), means the main function won't return anything after completion.

2.10 Why do we need to use comments in programs?

Ans: Comments help us to and others to quickly understand the code. It increases readability. It's like an in-build documentation of a code.

2.11 Why is the look of a program is important?

Ans: Look is important in programming. Because without proper indentation and layout it becomes hard to understand and decreases readability.

2.12 Where are blank spaces permitted in a C program?

Ans: Blank spaces are permitted after loop and conditions, on new lines to increase readability. We also use blank statements in a block statement.

2.13 Describe the structure of a C program?

Ans: A C program's structures are

- 1) Text Documentation section, 2) Link section,
- 3) Global definition section, 4) Global declaration section,
- 5) Main program, 6) Sub program

2.14 Describe the process of creating and executing a c program under UNIX system

Ans: To execute a c program from bash shell, we have to run

> cc main.c

and it'll compile it into a binary file.

2.15 How do we implement multiple source program files?

Ans: For multiple source programming files we have to write each files separately.

Then we have to compile each source file into an object using:

> gcc -c sourcefile.c

This will create an object file with the same name as the source file,

but with .o extension. Then we have to link them together with gcc -o

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2.1 Find errors, if any, in the following program

```
/* A simple program
int main ()
{
    /* Does nothing */
}
```

Ans:

```
#include <stdio.h>
/* A simple program */
int main ()
{
    /* Does nothing */
}
```

2.2 Find errors, if any, in the following program

```
#include (stdio.h)
void main(void)
{
    printf("Hello e");
}
```

Ans.

```
#include <stdio.h>
void main(void)
{
    printf ("Hello e");
}
```

YX

2.3 Find errors, if any, in the following program

Include <math.h>

main {

FLOAT X;

X = 2.5;

y = exp(x);

Print (x,y);

}

Ans:

include <math.h>

include <stdio.h>

int main()

{

float x;

x = 2.5;

float y;

y = exp(x);

printf ("%lf %lf", x, y);

}

Programming Exercises

2.1 Write a program to display the equation of a line in the form

$$ax + by = c$$

for $a=5$, $b=8$, $c=18$

Ans:

```
#include <stdio.h>
void printer(int a, int b, int c)
{
    printf ("%d.x + %d.y = %d", a, b, c);
}
int main()
{
    printer(5, 8, 18);
    return 0;
}
```

2.2 Write a C program that uses an in-built function to draw a 3D bar.

Ans:

```
#include <graphics.h>

int main()
{
    int gd = DETECT, gm;
    initgraph(&gd, &gm, "c:\TC\BGI");
    settextstyle(BOLD_FONT, HORIZ_DIR, 2);
    outtextxy(275, 0, "3D BAR GRAPH");
    setlinestyle(SOLID-LINE, 0, 2);
    line(90, 410, 90, 50);
    line(90, 410, 590, 410);
    line(85, 60, 90, 50);
    line(95, 60, 90, 50);
    line(585, 405, 590, 410);
    line(585, 415, 590, 410);
    outtextxy(65, 60, "y");
    outtextxy(570, 420, "X");
    outtextxy(70, 415, "O");
    setfillstyle(XHATCH-FILL, RED);
    closegraph();
    return 0;
}
```

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2.3 write a program to output the following multiplication table:

$$5 \times 1 = 5$$

$$5 \times 2 = 10$$

$$5 \times 3 = 15$$

.....

$$5 \times 10 = 50$$

Ans:

```
#include <stdio.h>

void printer(int a)
{
    for (int i=1; i<=10; i++)
        printf ("%d x %d = %d\n", a, i, a*i);
}
```

```
int main()
```

```
{
    printer(5);
    return 0;
}
```

Q.4 Given the values of three variables a, b and c,
write a program to compute and display the
value of n, where $n = \frac{a}{b-c}$.
Execute your program for the following values:

(a) a = 250, b = 85, c = 25

(b) a = 300, b = 70, c = 70

Ans:

```
#include <stdio.h>
void printer(int a, int b, int c)
{
    printf ("a = %d\n", a);
    printf ("b = %d\n", b);
    printf ("c = %d\n", c);
    printf ("ans = %d\n\n", (a/(b-c)));
}
int main()
{
    printer(250, 85, 25);
    printer(300, 70, 70);
    return 0;
}
```

2.5 Write a C program that reads the value of distance travelled by a car and the time taken for the same. Next compute the speed at which the car travelled.

Ans:

```
#include <stdio.h>

void input(int i[])
{
    scanf("%d %d", &i[0], &i[1]);
}

void printer(int a, int b)
{
    printf("distance = %d\n", a);
    printf("time = %d\n", b);
    printf("speed = %d\n\n", (a/b));
}

int main()
{
    int i[2];
    input(i);
    printer(i[0], i[1]);
    return 0;
}
```

2.6 Write a C program to print the current system date

Ans:

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

int main()
{
    time_t t;
    time(&t);
    printf("%s", ctime(&t));
    return 0;
}
```

2.7 Given two integers 20 and 10, write a program that uses a function add() to add these two numbers and sub() to find the difference of these two numbers and then display in the following form:

$$20 + 10 = 30$$

$$20 - 10 = 10$$

Ans:

```
#include <stdio.h>

void input(int i[])
{
    scanf("%d %d", &i[0], &i[1]);
}

void add(int a, int b)
{
    printf("%d + %d = %d\n", a, b, a+b);
}

void sub(int a, int b)
{
    printf("%d - %d = %d\n", a, b, a-b);
}

int main()
{
    int i[2];  input(i);
    add(i[0], i[1]);  sub(i[0], i[1]);
}
```

2.8 Modify the above program to provide border lines to the address.

Ans:

We can modify the add() and sub() function and decorate them with printf function.

```
void add(int a, int b)
```

```
{
```

```
    printf("-----\n");
```

```
    printf("%d + %d = %d\n", a, b, a+b);
```

```
    printf("-----\n");
```

```
}
```

```
void sub(int a, int b)
```

```
{
```

```
    printf("-----\n");
```

```
    printf("%d - %d = %d\n", a, b, a-b);
```

```
    printf("-----\n");
```

```
}
```

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Q.9 Write a program using one print statement to print the pattern of asterisks as shown below:

*
* *
* * *

Ans:

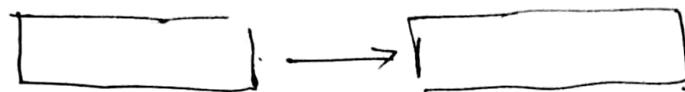
```
#include <stdio.h>
void input(int *i)
{
    scanf("%d", i);
}

void printer(int a)
{
    for (int i=0; i<=a; i++)
    {
        for (int j=0; j<1; j++)
        {
            printf("*");
        }
        printf("\n");
    }
}

int main()
{
    int i; input(&i);
    printer(i);
}
```

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2.10. Write a program that will print
the following figure using suitable ch



Ans:

```
#include <stdio.h>
void printer(void)
{
    printf("-----\t");
    printf("-----\n");
    printf("|\t");
    printf("|\n");
    printf("|\t");
    printf("\n");
    printf("----> .");
    printf("|\t");
    printf("|\n");
    printf("|\t");
    printf("\n");
    printf("-----\t");
    printf("-----\n");
}

int main()
{
    printer();
    return 0;
}
```

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2.11. Area of a triangle is given by the formula

$$A = \sqrt{s(s-a)(s-b)(s-c)}$$

where a , b , and c are sides of the triangle and $s = a+b+c$. Write a program to compute the area of the triangle given the values of a , b and c .

Ans:

```
#include <stdio.h>
#include <math.h>
void input(int i[])
{
    scanf("%d %d", &i[0], &i[1], &i[2]);
}
void printer(int a, int b, int c);
{
    int s=(a+b+c)/2;
    float area=sqrt(s*(s-a)*(s-b)*(s-c));
    printf("Area = %f\n", area);
}
int main()
{
    int i[3];
    input(i);
    printer(i[0], i[1], i[2]);
}
```

2.12 Write a program to display simple arithmetic calculator:

Ans:

```
#include <stdio.h>
void input (int i[])
{
    scanf ("%d %d", &i[0], &i[1]);
}

void printer(int a, int b)
{
    printf ("-----\n");
    printf ("sum = %d\n", a+b);
    printf ("-----\n");
    printf ("product = %d\n", a*b);
    printf ("-----\n");
    printf ("difference = %d\n", a-b);
    printf ("-----\n");
    printf ("division = %d\n", a/b);
    printf ("-----\n");
}

int main()
{
    int i[2]; input(i);
    printer(i[0], i[1]);
    return 0;
}
```

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2.13 Distance between two points (x_1, y_1) and (x_2, y_2) is governed by the formula

$$D^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$$

Write a program to compute D given the coordinates of the points

Ans:

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

void input(int i[])
{
    scanf("%d %d %d %d", &i[0], &i[1], &i[2],
&i[3]);
}

void printer(int a, int b, int c, int d)
{
    float dist = sqrt(((b-a)*(b-a)) + (d-c)*(d-c));
    printf("Distance = %d", dist);
}

int main()
{
    int i[4];
    input(i);
    printer(i[0], i[1], i[2], i[3]);
    return 0;
}
```

2.14 A point on the circumference of a circle whose center is $(0, 0)$ is $(4, 5)$. Write a program to compute perimeter and area of the circle.

Ans:

```
#include <stdio.h>
#include <math.h>
#define PI 3.14159

void printer(int a, int b, int c, int d)
{
    float dist = sqrt(((b-a)*(b-a)) + ((d-c)*(d-c)));
    float peri = 2 * PI * dist;
    float area = PI * dist * dist;
    printf("Perimeter = %f\n", peri);
    printf("Area = %f\n", area);
}

int main()
{
    printer(0, 0, 4, 5);
    return 0;
}
```

Q15 The line joining the points (2,2) and (5,6) which lie on the circumference of a circle is the diameter of the circle. Write a program to compute the area of the circle.

Ans:

```
#include <stdio.h>
#include <math.h>
#define PI 3.14159

void printer(int a, int b, int c, int d)
{
    float dist = sqrt(((b-a)*(b-a)) + ((d-c)*(d-c)));
    float rad = dist/2;
    float area = PI * rad * rad;
    printf("Area: %f\n", area);
}

int main()
{
    printer(2, 2, 5, 6);
    return 0;
}
```

Interview Questions

2.1 Name some of the key features of c programming language.

Ans: C is efficient and fast. As a low level language it can directly access hardware. As it's flexible and portable it can be compiled on different platforms.

2.2 Which symbol is used to indicate the end of most c programming statements?

Ans: ';' is used to indicate the end of most c statements.

2.3 Do you consider c as a high level programming language?

Ans: In c programming we have to manually handle some tasks like memory allocation, pointers and

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data types, we can safely assume it's a mid level language. But due to its flexibility, portability and standard library a lot of people consider it as a high level.

2.4 Which punctuation symbols are used to represent code blocks in C?

Ans: '{' and '}' are used to represent code blocks in C.

2.5 Which function is the starting point in a C program?

Ans: main() function is the starting point in a C program.

2.6 Which return value of main() function indicates successful completion of the program?

Ans: Return value 0 means successful execution.