Q.2 a. Define algorithm and explain it with a suitable example. (6)

Answer:

Page 2 - 3

b. Convert $(12.25)_{10}$ into a binary number. (4)

Answer:

The answer is 1100.01

c. What are the different ways in which a character is represented? (6)

Answer:

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Q.3 a. Explain the function of an optical mouse? (5)

Answer:

An optical mouse is an advanced computer pointing device that uses a light-emitting diode (LED), an optical sensor, and digital signal processing (DSP) in place of the traditional mouse ball and electromechanical transducer. Movement is detected by sensing changes in reflected light, rather than by interpreting the motion of a rolling sphere.

The optical mouse takes microscopic snapshots of the working surface at a rate of more than 1,000 images per second. If the mouse is moved, the image changes. The tiniest irregularities in the surface can produce images good enough for the sensor and DSP to generate usable movement data. The best surfaces reflect but scatter light; an example is a blank sheet of white drawing paper. Some surfaces do not allow the sensor and DSP to function properly because the irregularities are too small to be detected. An example of a poor optical-mousing surface is unfrosted glass.

In practice, an optical mouse does not need cleaning, because it has no moving parts. This all-electronic feature also eliminates mechanical fatigue and failure. If the device is used with the proper surface, sensing is more precise than is possible with any pointing device using the old electromechanical design. This is an asset in graphics applications, and it makes computer operation easier in general.

b. What are the major services provided by DOS? (5)

Answer:

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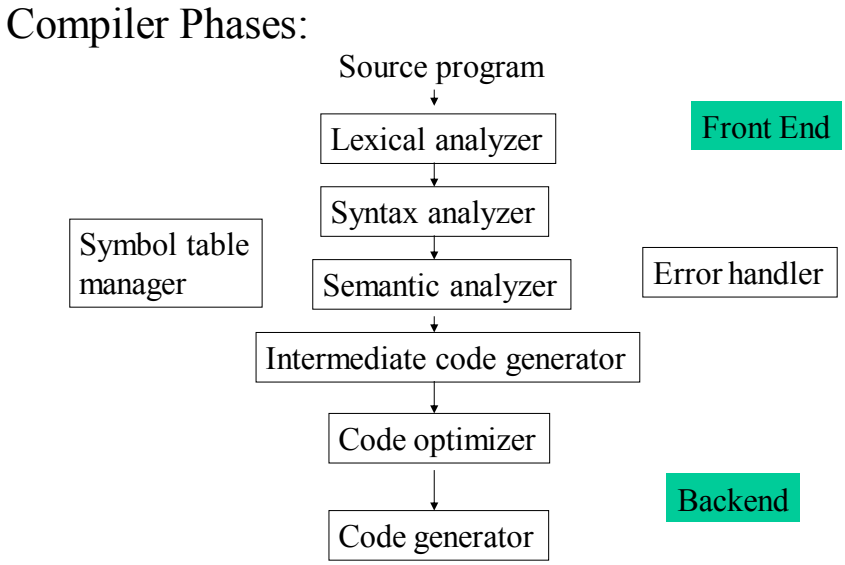
c. What are the different phases in compilation of a program? (6)

Answer:



Q.4 a. What are the essential components of a micro-computer? What is the role of control unit? (4+4)

Answer:

Refer to the prescribed text book.

b. How does an internet differ from intranet? (4)

Answer:

Internet is the worldwide interconnection of all smart communication devices that have a valid IP. On the other hand, intranet is a privately owned part of the internet under which only a selected number of IPs are allowed to communicate. Intranet is commonly used in connecting computers of a certain organization to remain connected and don't face any interference from the IPs outside the intranet. Most of intranet accessing modes refer to the website of the organization which can only be accessed by its employees who have a user name and password. However, the website and the servers for this purpose form the essential information technology foundation for the company. Thus, the website enables a network for its employees to connect irrespective of their location and time. The website, though available through the internet methods, is not accessible unless a gateway is provided for data exchange.

c. What is W3C Protocol? (4)

Answer:

W3C Stands for the **World Wide Web Consortium**

- W3C was created in **October 1994**
- W3C was created by **Tim Berners-Lee**
- W3C was created by the **Inventor of the Web**

- W3C is organized as a **Member Organization**
- W3C is working to **Standardize the Web**
- W3C creates and maintains **WWW Standards**
- W3C Standards are called **W3C Recommendations**

W3C is working to make the Web accessible to all users (despite differences in culture, education, ability, resources, and physical limitations)

W3C also coordinates its work with many other standards organizations such as the Internet Engineering Task Force, the Wireless Application Protocols (WAP) Forum and the Unicode Consortium.

W3C is hosted by three universities:

- Massachusetts Institute of Technology in the U.S.
- The French National Research Institute in Europe
- Keio University in Japan

W3C Recommendations

The most important work done by the W3C is the development of Web specifications (called "Recommendations") that describe communication protocols (like HTML and XML) and other building blocks of the Web.

Each W3C Recommendation is developed by a work group consisting of members and invited experts. The group obtains its input from companies and other organizations, and creates a Working Draft and finally a Proposed Recommendation. In general the Recommendation is submitted to the W3C membership and director, for a formal approval as a W3C Recommendation. The specification approval process is described in the next chapter.

PART B
Answer any THREE questions. Each question carries 16 marks.

Q.5 a. What is the role of main() function in a C program? Can we develop a C program without a main() function? (8)

Answer:
Refer to the prescribed text book.

b. What is format specifier in a printf() statement of C language? Differentiate between %g and %e with a suitable example. (8)

Answer:
Refer to the prescribed text book.

Q.6 a. Taking a suitable example, explain the function of 'ternary' operator. How can you write a ternary expression using if..else statement? (8)

Answer:
Refer to the prescribed text book.

b. Find the syntax error in the following program: (8)

```
Main()
{
  int x,
  float y;
  int long z, w;

  y ++; w = ++y;
  printf (x, y, z, w)
}
```

Answer:
Errors are:

Line #1: Semicolon (;) should be in place of (,) at the end of line.
Line #3: In place of **int long**, it should be **long int**.
Line #4: type mismatch
Line#5: Format specifier is missing in printf() and at the end of line there should be (;).

Q.7 a. Define one-dimensional array? How arrays can be initialized at compile time and at run-time? Explain. (2+6)

Answer:
Page 192, 194 – 195 of prescribed book

b. Write a function to compare two strings x and y. The function should return '0' if x and y are equal, '-1' if x is less than y and "1" if x is greater than y. (8)

Answer:
Refer to the prescribed text book.

Q.8 a. Define the following: (2×4)
(i) Local variable (ii) Global variable
(iii) Static variable (iv) External variable

Answer:
Refer to the prescribed text book.

b. Write a function to determine square of sum of two integers and if the square has digit 1 at its unit place then the function returns 5 else it returns 7. (8)

Answer:

```
#include <stdio.h>
main()
{
int a, b;
int sum(int, int);
a = 5;
b = 8;
printf("%d", sum(a, b));
getchar();
}

int sum(int a, int b)
{
int z;
z = (a + b) * (a + b);
if((z % 10) == 1) return 5;
else return (7);
}
```

Q.9 a. Differentiate between a pointer and an array. (8)

Answer:

Pointer	Array
1. A pointer is a place in memory that keeps address of another place inside	1. An array is a single, pre allocated chunk of contiguous elements (all of the same type), fixed in size and location.
2. Pointer can't be initialized at definition.	2. Array can be initialized at definition. Example int num[] = { 2, 4, 5}
3. Pointer is dynamic in nature. The memory allocation can be resized or freed later.	3. They are static in nature. Once memory is allocated, it cannot be resized or freed dynamically.
4. The assembly code of Pointer is different than Array	4. The assembly code of Array is different than Pointer.

b. What is a malloc( ) function and how is it different from calloc()? (4)

Answer:

`malloc` returns a block of memory that is allocated for the programmer to use, but is uninitialized. The memory is usually initialized by hand if necessary -- either via the **`memset`** function, or by one or more assignment statements that dereference the pointer. An alternative is to use the **`calloc`** function, which allocates memory and then initializes it.

The malloc and calloc differs in the number of arguments. The malloc allocates memory of given size but the calloc can allocates array of memory locations of given size.

c. Consider the following declaration and justify which of the followings are correct?
int x, *y, z[30];
(i) x = z **(ii) y = z;**
(iii) z = x; **(iv) y = x;** **(4)**

Answer:
x is an integer type variable, y is a variable pointer of integer type and z is a constant pointer. Therefore Assignment (i) is invalid, (ii) is a valid assignment, (iii) is invalid and (iv) may be valid provided the value of x is not addressing some protected area of memory.

TEXT BOOK

I. Fundamentals of Computers, V. Rajaraman, Fourth Edition, PHI, 2007
II. Programmeming in ANSI C, E. Balagurusamy, Third Edition, Tata McGraw Hill