Assignment No - 9

Q) What is pointer? explain the term with an example.

→ Pointer :-

- pointer is considered as derived datatype in c and c++
- in java programming there is no such concept of pointer
- pointer is considered as variable which store the memory address
- pointer is such a special variable which ~~store the memory address~~ can store the memory address of anything the power of pointer is to fetch the data whose address is stored in it.
- we can create a pointer which points to any primitive datatype
- pointer is a special variable which holds the address of each address of side unsign long.
- Every pointer is of 8 bytes because it holds the memory address is of type unsigned long

- Every pointer data fetching capacity is based on type of pointer if the pointer char* then it fetch 1 byte

- if the pointer is int* or float* then its fetch data fetching is 4 byte if the pointer is double* then data fetching capacity is 8 byte

- * operator is used with pointer to fetch the data that pointed datatype / variable

For example:-

```
# include <stdio.h>
int main()
{
    int i = 10;
    int *ip = &i;

printf("value of i %d \n", i);
printf("value pointed by ip %d \n", *ip);
printf("Address of i %u \n", &i);
printf("Address of ip %u \n", &ip);
```

- in above example variable i having datatype integer Assigned with value 10.

- ip is pointer which points to integer datatype variable i & currently store the memory Address of i.

Q2] what is mean by Null pointer? why we must initalize the pointer to NULL

→ NULL Pointer:-

- pointer which do not point to any memory location

- In C, a null pointer is commonly represented by the constant "0" or by the macro "NULL"

- Always initalize pointers to NULL when declaring them if you don't have a valid memory address to assign immediately.

Q3]. What are different types of pointers? list out them

→ following are the types of pointe

1) Integer pointer
2) Array pointer
3) Structure pointer
4) function pointer
5) Double pointer (Pointer to pointer)
6) NULL pointer
7) Void pointer
8) wild pointer
9) Constant pointer
10) pointer to Constant
11) far pointer
12) Dangling pointer
13) Huge pointer
14) Complex pointer
15) Near pointer

Q4) Write notes on pointer, size of pointer, data type of pointer

→ Pointer:-

- A pointer is a variable that holds the address of a variable or a function. A pointer is a powerful feature that adds enormous power and flexibility to C language. A pointer variable can be declared as

```
int i = 10;
int* ptr = &i;
```

Size of pointer:-

- Size of pointer variable is same for ~~every~~ every data type. it would be 8 bytes.

Datatype of pointer

- The datatype of a pointer is the type of data the pointer is pointing to for example: a pointer that points to an integer value is called an integer pointer.

Q5) What is mean by increment and decrement operator?

= In C, C++ and Java there are two operators which are used to increment (++) the value increased by 1 and as well as used to decrement (--) the value decreased by 1.

Increment operator (++)

- It is one type of short hand operator
- classified as in 2 types
  1) pre- increment
  2) Post-increment

1) Pre- increment (++i)

- In the Pre-increment operator first we increment value by 1 & then Assignment operator used

2) Post - increment (i++)

- In the post-increment operator we Assign first & then increment operator ++ is used.

2) Decrement operator

- It is one type of short hand operator
- In this the value of the variable is decreased by 1
- there are 2 type of Decrement operator

1) Pre-Decrement (--i)

- In this operator we firstly use decrement operator & the use the Assignment operator

2) Post-Decrement (i--)

- In this operator we firstly use the Assignment operator & then we use decrement operator.

q6] what is pointer to pointer, explain with example & write a program to demonstrate this

→ Pointer to Pointer

- A pointer to pointer also known as double pointer, is a chain of pointers or multiple indirection that stores the address of another pointer

- for example:

```
datatype ** pointer_name
int ** ip
```

Program

```
#include <stdio.h>
int main()
{
    int a = 10;
    int *p = &a;
    int **ptp = &p;

    printf("value of a = %d\n", a);
    printf("value of pointer p %d\n", *p);
    printf("value of ptp %d\n", **ptp);

    return 0;
}
```

q7) →

(7) Write note on pointer arithmetic

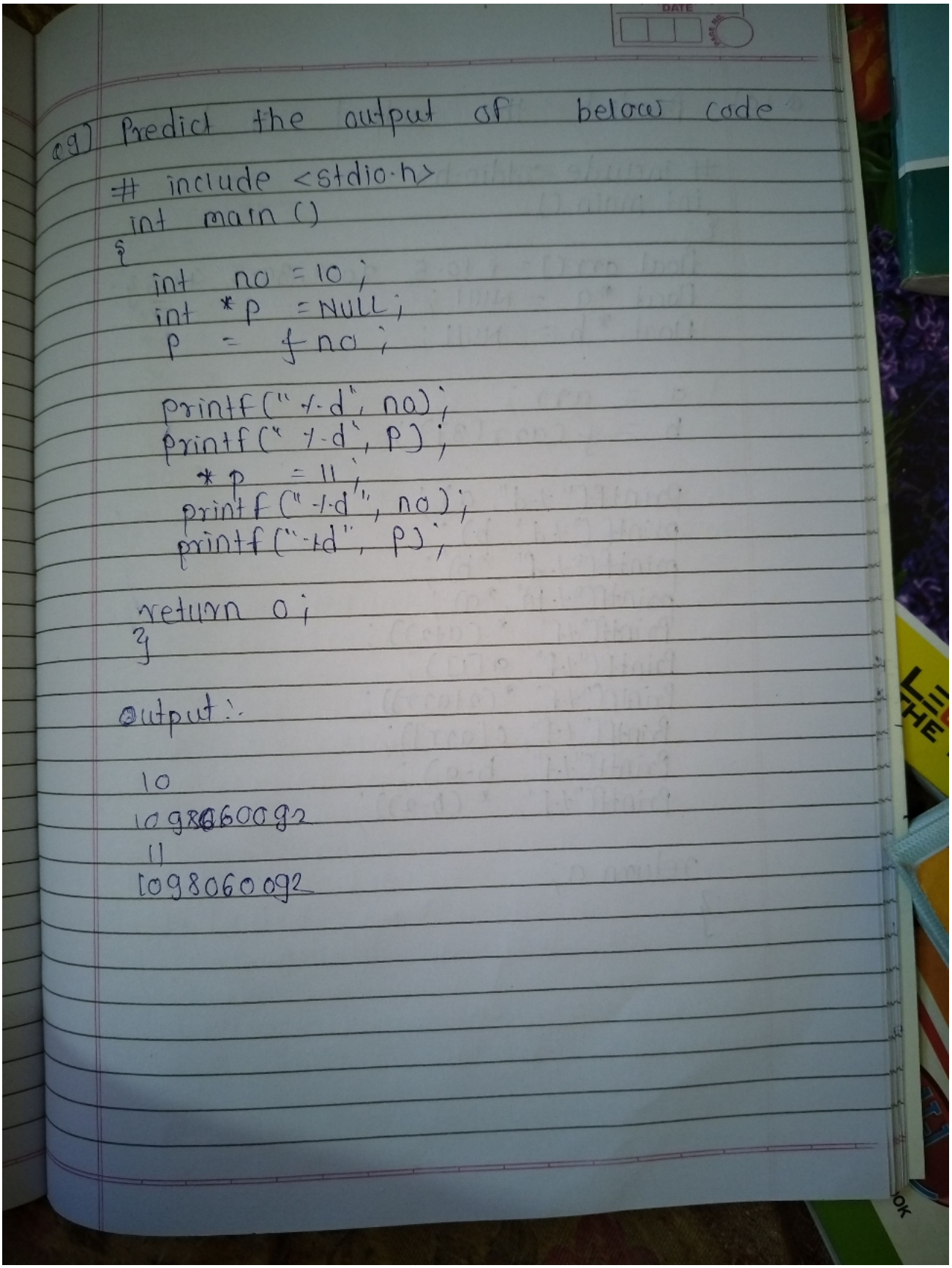
→ Pointer Arithmetic:-

- In case of pointer th Arithmetic operations are not like normal operators that perform on numeric values
- To use the concept of pointer Arithmatic there should be atleast 2 pointers
- Both the pointer should be same datatype
- Both the pointer should be pointed same region (expected Array)
- In the pointer Arithmatic pointer increment, decrement is allowed
- Addition of two pointer is not allowed in pointer Arithmatic
- Addition of any number with pointer is also allowed
- Substraction of two pointer is allowed in pointer Arithmatic
- Substraction of any number with pointer is also allowed

Q8) Explain how array is considered as pointer & pointer can be treated as Array

→ An Array of pointers or pointer arrays as they are commanly known, is an array that contains different pointer variables.

- we can create individual pointer variables that point to various value ranges or we can create a single integer array of pointers that point to all available values



Q9) Predict the output of below code

```
#include <stdio.h>
int main()
{
    int no = 10;
    int *p = NULL;
    p = &no;

    printf("%d", no);
    printf(" %d", p);
    *p = 11;
    printf("%d", no);
    printf("%d", p);

    return 0;
}
```

Output:

```
10
1098060092
11
1098060092
```

Q10) Predict the output of below code

```
#include <stdio.h>
int main()
{
 float arr[] = {10.5, 20.2, 30.5, 40.6};
 float *a = NULL;
 float *b = NULL;

 a = arr;
 b = &(arr[3]);

 printf("%d", a);
 printf("%d", b);
 printf("%f", *b);
 printf("%f", *a);
 Printf("%f", *(a+2));
 Printf("%f", a[1]);
 Printf("%f", *(2+arr));
 Printf("%f", 0[arr]);
 Printf("%f", b-a);
 Printf("%f", *(b-2));

 return 0;
}
```

output:-

617630304
617630292
40.5
10.5
30.5
20.2
30.5
10.5
10.5
20.2