Theory:

Pointers are a fundamental concept in the C programming language. They provide a way to work directly with memory addresses, enabling efficient memory management and access to data.

Declaration:

int *ptr;

ASSIGNMENT:1

PROBLEM:
Write a program in C to implement array of pointers and pointers to arrays.

SOURCE CODE:

```
#include <stdio.h>
void main()
{
   int size;
   printf("This is roll no 317!!\n");
   printf("Enter the size of array:");
   scanf("%d", &size);
   int arr[size];
   printf("Enter elements:");
   for (int i = 0; i < size; i++)
   {
      scanf("%d", &arr[i]);
   }
   int *ptr = arr;
   printf("The pointer to array is:%p", ptr);
}
```

OUTPUT:

```
This is roll no 317!!
Enter the size of array:4
Enter elements:23
34
45
65
The pointer to array is:0061FEC8
```

#Array to pointer

SOURCE CODE:

```
#include<stdio.h>

int main()
{


   int num1 = 10;
   int num2 = 20;
   int num3 = 30;


   int* ptr_arr[3] = { &num1, &num2, &num3 };

   for (int i = 0; i < 3; i++) {
      printf("Value of var%d: %d\tAddress: %p\n", i + 1, *ptr_arr[i], ptr_arr[i]);
   }
   return 0;
}
```

Output:

```
Value of var1: 10       Address: 0061FF18
Value of var2: 20       Address: 0061FF14
Value of var3: 30       Address: 0061FF10
```

ASSIGNMENT:2

PROBLEM:
Write a program in C to implement pointers to structures

SOURCE CODE:

```
#include <stdio.h>

struct student
{
   int id;
   char full_name[50];
};

int main()
{
   printf("Student Information System\n");
   printf("Enter your student ID: ");

   struct student stud;
   scanf("%d", &stud.id);

   printf("Enter your full name: ");
   scanf("%s", stud.full_name);

   struct student *stud_ptr = &stud;

   printf("Name: %s\t Memory Address: %p\n", stud.full_name, &stud.full_name);
   printf("ID: %d\t Memory Address: %p\n", stud.id, &stud.id);

   return 0;
}
```

Output:

```
Student Information System
Enter your student ID: 317
Enter your full name: SHIV
Name: SHIV       Memory Address: 0061FEE8
ID: 317          Memory Address: 0061FEE4
```

ASSIGNMENT:3

PROBLEM:

Write a program in C to perform swapping of two numbers by passing address of the variables to the function.

SOURCE CODE:

```
#include <stdio.h>

int customSwap(int *x, int *y) {
   int temp = *x;
   *x = *y;
   *y = temp;
}

int main() {
   printf("Number Transformation Enigma\n");

   int num1, num2;
   printf("Enter the first enigma number: ");
   scanf("%d", &num1);
   printf("Enter the second enigma number: ");
   scanf("%d", &num2);

   customSwap(&num1, &num2);

   printf("The enigma's hidden truth: %d\n", num1);
   printf("The enigma's revealed secret: %d\n", num2);

   return 0;
}
```

OUTPUT:

```
Number Transformation Enigma
Enter the first enigma number: 23
Enter the second enigma number: 34
The enigma's hidden truth: 34
The enigma's revealed secret: 23
```