C_103 ⇒ Applications of function Pointers in C
Array of function pointers

* one application of function pointer is Call back function.

* Another application of function pointer is, instead of switch program code, we use function pointer for same program, because we will have only less program code.

* First we take four functions for addition, subtraction, multiplication and divisions.
add(), sub(), mul(), div():

0 for add
1 for sub
2 for mul
3 for DIV.

according to user choice we will call those functions and that operation is performed.

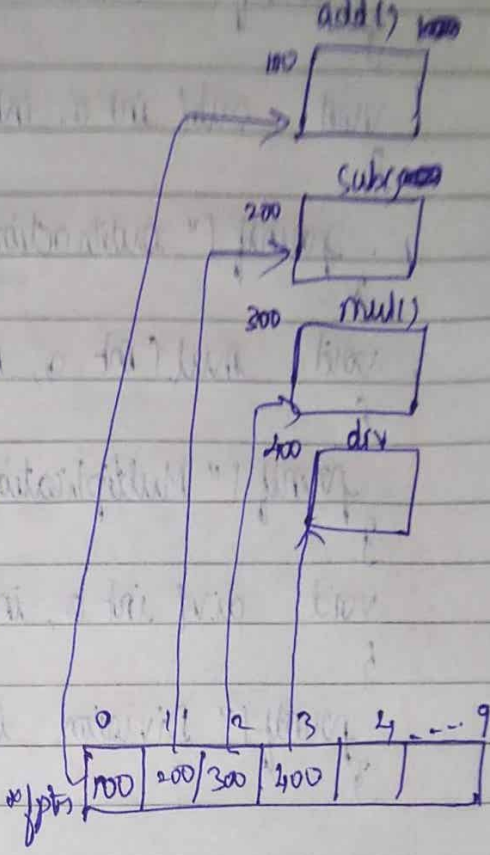
* We can do this using switch and also with function pointers.

* So for this we want four function pointer or array of function pointer.

array of function pointers
Calling functions using function pointers

```
void add(int a, int b)
{
  printf("%d\n", a+b);
}
void sub(int a, int b)
{
  printf("%d\n", a-b);
}
void mul(int a, int b)
{
  printf("%d\n", a*b);
}
void div(int a, int b)
{
  printf("%d\n", a/b);
}

void main()
{
  int ch, a, b;
  void (*fptr[10])(int, int) = {add, sub, mul, div};
  printf("Enter choice:\n");
  scanf("%d", ch);
  printf("Enter a and b values:\n");
  scanf("%d %d", a, b);
  (*fptr[ch])(a, b);
}
```



printf("0 for add\n 1 for sub\n 2 for display\n 3 for mul\n");

Using switch statement

```
void add(int a, int b)
{
  printf("Addition is %d\n", a+b);
}
void sub(int a, int b)
{
  printf("subtraction is %d\n", a-b);
}
void mul(int a, int b)
{
  printf("Multiplication is %d\n", a*b);
}
void div(int a, int b)
{
  printf("Division is %d\n", a/b);
}

int main()
{
  int ch, a, b;
  printf("0 for addition\n 1 for subtraction\n
      2 for multiplication\n 3 for division\n");
  printf("Enter choice\n");
  scanf("%d", &ch);
  printf("Enter values of a & b\n");
  scanf("%d %d", &a, &b);
  switch(ch)
  {
    case 0: add(a,b); break;
    case 1: sub(a,b); break;
    case 2: mul(a,b); break;
    case 3: div(a,b); break;
    default: printf("Enter valid choice");
  }
}
```

```c
#include <stdio.h>
#include <stdlib.h>
/** 1 - ARRAY OF FUNCTON POINTERS **/
/** APPLICATION OF FUNCTION POINTERS **/
int sum(int a,int b)
{
 printf("Addition is %d\n",a+b);
}
int sub(int a,int b)
{
 printf("Subtraction is %d\n",a-b);
}
int mul(int a,int b)
{
 printf("Multiplication is %d\n",a*b);
}
int divi(int a,int b)
{
printf("Division is %d\n",a/b);
}

int main()
{
   int choice;
   printf("Calculator function\n");
   printf("\n 0 for addition\n 1 for subtraction\n 2 for multiplication\n 3 for division\n");
   printf("Enter the choice:\n");
   scanf("%d",&choice);
   if(choice<4)
   {
    int (*fptr[10])(int,int)={sum,sub,mul,divi};
   int a,b;
   printf("Enter the values of a and b:\n");
   scanf("%d %d",&a,&b);
   (*fptr[choice])(a,b);
   }
   else
   printf("Enter valid choice between 0 to 3\n");
   getch();
}
```

```
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Calculator function

 0 for addition
 1 for subtraction
 2 for multiplication
 3 for division
Enter the choice:
2
Enter the values of a and b:
2 5
Multiplication is 10
```
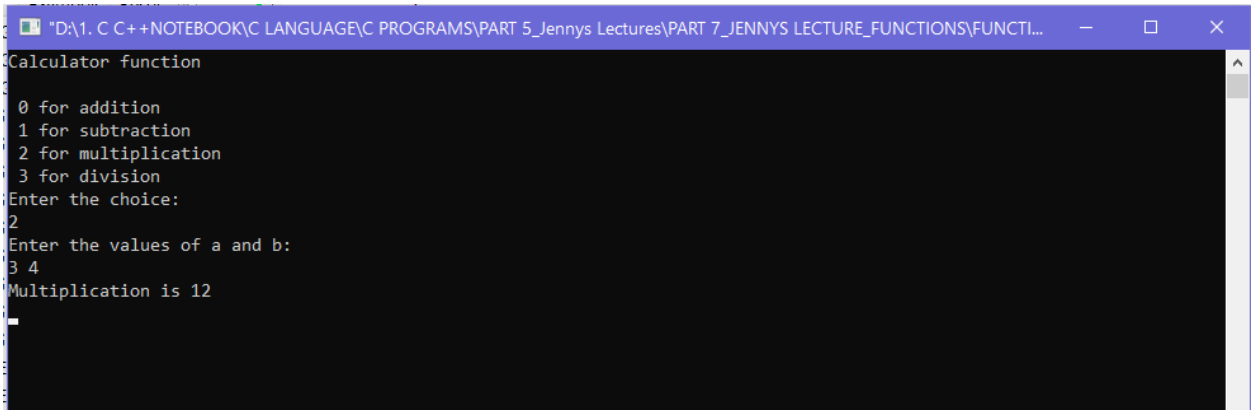

```c
#include <stdio.h>
#include <stdlib.h>
/** 2 - WITHOUT USING ARRAY OF FUNCTON POINTERS WE USE SWITCH **/
/** DISADVATAGE OF USING SWITCH - IT HAS MANY LINES OF CODE **/
int sum(int a,int b)
{
 printf("Addition is %d\n",a+b);
}
int sub(int a,int b)
{
 printf("Subtraction is %d\n",a-b);
}
int mul(int a,int b)
{
 printf("Multiplication is %d\n",a*b);
}
int divi(int a,int b)
{
printf("Division is %d\n",a/b);
}

int main()
{
  printf("Calculator function\n");
  printf("\n 0 for addition\n 1 for subtraction\n 2 for multiplication\n 3 for division\n")
  printf("Enter the choice:\n");
  int choice;
  int choice;
  scanf("%d",&choice);
  if(choice<4)
  {
   int a,b;
   printf("Enter the values of a and b:\n");
   scanf("%d %d",&a,&b);
   switch(choice)
   {
   case 0:
    sum(a,b);
    break;
   case 1:
    sub(a,b);
    break;
   case 2:
    mul(a,b);
    break;
   case 3:
    divi(a,b);
   }
  }
   else
    printf("Enter a valid choice\n");
getch();
}
```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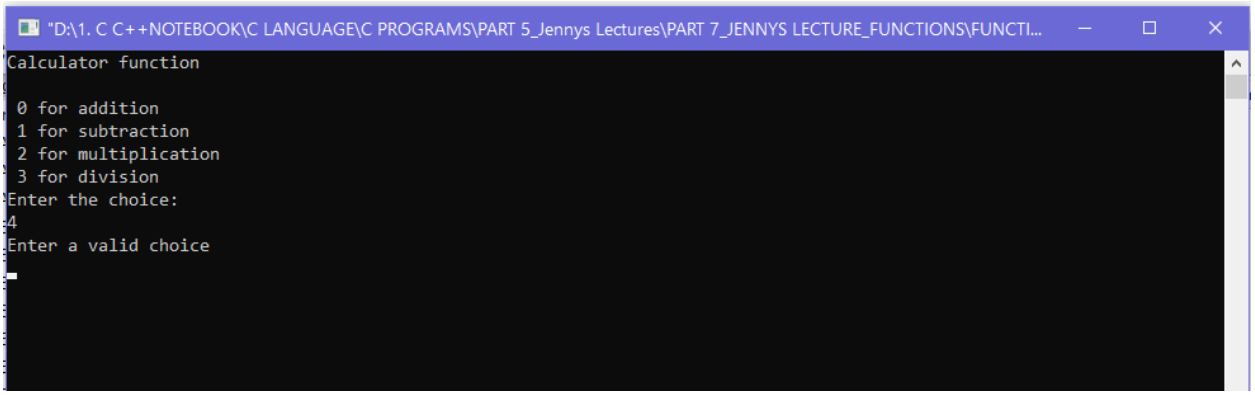
Calculator function
0 for addition
1 for subtraction
2 for multiplication
3 for division
Enter the choice:
2
Enter the values of a and b:
3 4
Multiplication is 12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Calculator function
0 for addition
1 for subtraction
2 for multiplication
3 for division
Enter the choice:
4
Enter a valid choice