

# Programming with C and C++

*CSC-101 (Lecture 21)*

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# Arrays and Pointers in C++



```
1  #include <stdio.h>
2  int main(void) {
3      int a[5]={10,20,30,40,50};
4      for (int i=0; i<5; i++)
5      {
6          printf("%d\n",a[i]);
7          printf("%x\n",a+i);
8          printf("%d\n",*(a+i));
9          printf("%d\n\n",i[a]);
10     }
11     return 0;
12 }
```

<https://ideone.com/FNG35q>

# Output



10	30	50
b82fc820	b82fc828	b82fc830
10	30	50
10	30	50
20	40	
b82fc824	b82fc82c	
20	40	
20	40	

A faint background illustration showing a lion on the left and a cat on the right, both looking towards the center. The lion is standing on a pedestal, and the cat is sitting on a surface.

# Pointers



```
1  #include<stdio.h>
2
3  int main(){
4      int u=5;
5      int *pu=&u;
6      printf("pu=%x,&u=%x,*pu=%d\n",pu,&u,*pu);
7      return 0;
8  }
9
```

⚙️ stdout

<https://ideone.com/YxhcDK>

pu=f7747f04,&u=f7747f04,\*pu=5

# Pointers



1. `#include<stdio.h>`

2.

3. `int main(){`

4. `int u=50;`

5. `int* pu=&u;`

6. `printf("pu=%x,&u=%x,*pu=%d\n",pu,&u,*pu);`

7. `return 0;`

8. `}`

⚙️ stdout

pu=2e601844,&u=2e601844,\*pu=50

<https://ideone.com/cSl3uP>

# Pass by Reference in C



</> source code

```
1  #include <stdio.h>
2
3  // Function to swap two integers using call by reference
4  void swapByRef(int* num1, int* num2) {
5      int temp = *num1;
6      *num1 = *num2;
7      *num2 = temp;
8  }
9
10 int main() {
11     int num1, num2;
12
13     printf("Enter the first integer: ");
14     scanf("%d", &num1);
15
16     printf("Enter the second integer: ");
17     scanf("%d", &num2);
18
```



```
19     printf("Before swapping: num1 = %d, num2 = %d\n", num1, num2);
20
21     // Call the swapByValue function to swap num1 and num2 (but it won't work)
22     swapByRef(&num1, &num2);
23
24     printf("After swapping (call by value): num1 = %d, num2 = %d\n", num1, num2);
25
26     return 0;
27 }
28
29
```

<https://ideone.com/0IBUtV>

⚙️ stdout

📄 copy

Enter the first integer: Enter the second integer: Before swapping: num1 = 40, num2 = 50  
After swapping (call by value): num1 = 50, num2 = 40

# Find the output



```
1  #include <stdio.h>
2  int main() {
3      int x = 1, z[2] = {10, 11};
4      int *p = NULL;
5      p = &x;
6      *p = 10;
7      p = &z[1];
8      *(&z[0] + 1) += 3;
9      printf("%d, %d, %d\n", x, z[0], z[1]);
10     return 0;
11 }
12
```

⚙️ stdout

10, 10, 14

<https://ideone.com/tZ74q5>



# Character Array and Pointers



```
1  #include <stdio.h>
2  #include <stdlib.h>
3
4  int main() {
5      char a[10]="IITRoorkee";
6
7      printf("%X \n", a);
8      printf("%s \n", a);
9      printf("%X \n\n", &a[0]);
10
11     printf("%X \n", a+1);
12     printf("%s \n", a+1);
13     printf("%X \n", &a[1]);
14
15     return 0;
16 }
17
```

<https://ideone.com/eChNBw>

Success #stdin #stdout 0s 5348KB

2C5A65EE

IITRoorkee

2C5A65EE

2C5A65EF

ITRoorkee

2C5A65EF

# gets and puts



```
1  #include<stdio.h>
2
3  int main()
4  {
5      char str[20] = "CSE@IITR!";
6
7      // puts is used to print the string char array
8      puts(str);
9
10     return 0;
11 }
12
```



stdin

Standard input is empty



stdout


CSE@IITR!

<https://ideone.com/PNV84w>


# gets and puts



```
1  #include<stdio.h>
2
3  int main()
4  {
5      char str[20];
6      printf("Enter the string? ");
7      gets(str);
8      // puts is used to print the string char array
9      puts(str);
10
11     return 0;
12 }
13
```

 stdin

Cricket World Cup 2023

 stdout

Enter the string? Cricket World Cup 2023

<https://ideone.com/qXc9AG>

# Character Arrays and Pointers



```
1  #include <stdio.h>
2
3  int main() {
4      char str[] = "Welcome to CS@IITR!";
5      char *ptr = str; // Assign the base address of the character array to a pointer
6
7      printf("Character array: %s\n", str);
8      printf("Printing characters using pointer:\n");
9
10     // Print characters using pointer
11     while (*ptr != '\0') {
12         printf("%c ", *ptr);
13         ptr++;
14     }
15
16     printf("\n");
17     return 0;
18 }
19
```

stdin

Standard input is empty

stdout

Character array: Welcome to CS@IITR!  
Printing characters using pointer:  
W e l c o m e t o C S @ I I T R !

<https://ideone.com/r2cqcW>

# Palindrome using function



</> source code

<https://ideone.com/Y5Y3Zq>

```
1  #include <stdio.h>
2  #include <stdbool.h>
3  #include <string.h>
4
5  bool isPalindrome(const char *str) {
6      int len = strlen(str);
7      int i, j;
8
9      for (i = 0, j = len - 1; i < j; i++, j--) {
10         if (str[i] != str[j])
11             return false;
12     }
13
14     return true;
15 }
16
```

```
17 int main() {  
18     char inputString[100];  
19     printf("Enter a string or number to check for palindrome: ");  
20     scanf("%s", inputString);  
21  
22     if (isPalindrome(inputString))  
23         printf("%s is a palindrome.\n", inputString);  
24     else  
25         printf("%s is not a palindrome.\n", inputString);  
26  
27     return 0;  
28 }  
29
```



stdout

Enter a string or number to check for palindrome: malayalam is a palindrome.

