Programming with C and C++

CSC-101 (Lecture 22)

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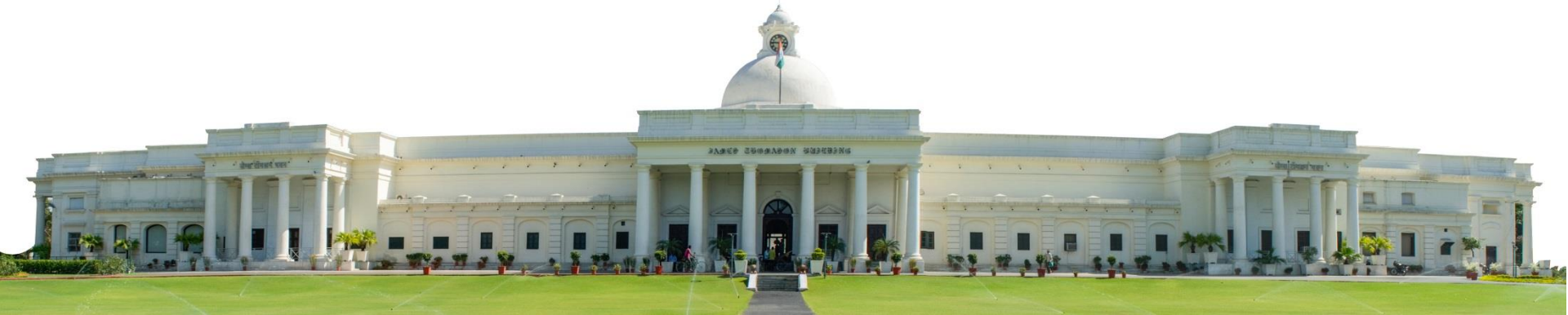

Palindrome using function

</> source code

https://ideone.com/Y5Y3Zq

```c
#include <stdio.h>
#include <stdbool.h>
#include <string.h>

bool isPalindrome(const char *str) {
    int len = strlen(str);
    int i, j;

    for (i = 0, j = len - 1; i < j; i++, j--) {
        if (str[i] != str[j])
            return false;
    }

    return true;
}

```

```c
int main() {
    char inputString[100];
    printf("Enter a string or number to check for palindrome: ");
    scanf("%s", inputString);

    if (isPalindrome(inputString))
        printf("%s is a palindrome.\n", inputString);
    else
        printf("%s is not a palindrome.\n", inputString);

    return 0;
}

```

stdout

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

Character Arrays and Pointers

```c
#include<stdio.h>

void printString(char *str)
{
    if(*str == '\0')
    {
        return;
    }
    printf("%c", *str);
    printString(++str);
}

int main()
{
    char str[15] = "Recursed";
    printString(str);
    return 0;
}

```

https://ideone.com/N5f148

stdout

```
Recursed
```

```c
#include <stdio.h>

int main(void) {
    char c[ ] = "CSE2023";
    char *p = c;
    printf("%s", p + p[2] - p[0] + 1);
    return 0;
}
```

stdout

```
2023
```

https://ideone.com/YHhF1n

Static variable

- An ordinary variable is limited to the scope in which it is defined, while the scope of the static variable is throughout the program.

Static variable

```c
#include <stdio.h>
int main()
{
    printf("%d",func());
    printf("\n%d",func());
    return 0;
}

int func()
{
    int count=0; // variable initialization
    count++; // incrementing counter variable
    return count;
}
```

stdout

```
1
1
```

https://ideone.com/kibY8C

Static variable

```c
#include <stdio.h>
int main()
{
    printf("%d",func());
    printf("\n%d",func());
    return 0;
}

int func()
{
    static int count=0; // static
    count++; // incrementing counter variable
    return count;
}
```

stdout

```
1
2
```

https://ideone.com/sgUF2z

Static variable

```c
#include <stdio.h>

int f(int n)
{
    int r = 0;
    if(n <= 0) return 1;
    if(n>3)
    {
        r = n;
        return f(n-2)+2;
    }
  return f(n-1)+r;
}

```

Static variable

```c
int main(void) {
    // your code goes here
    int k=f(5);
    printf("%d",k);
    return 0;
}
```

stdout

3

https://ideone.com/InocVe

Find the output?

```c
#include <stdio.h>
int main()
{
    int a[] = {2, 4, 6, 8, 10} ;
    int i, sum = 0, *b = a + 4 ;
    for (i = 0; i < 5; i++)
        sum = sum + (*b - i) - *(b - i) ;
    printf ("%d\n", sum) ;
    return 0 ;
}
```

Success #stdin #stdout 0s 5432KB

```
10
```

https://ideone.com/zmpESs

Static Array

```c
#include <stdio.h>

int main(void) {
	// your code goes here
	int a[10000000000];
	printf("%x",a);
	return 0;
}
```

https://ideone.com/A8PdXT

```
~$ ./a.out
Segmentation fault (core dumped)
~$
```

Runtime error #stdin #stdout 0s 5436KB

Dynamic Array

dynarr.c

```c
#include <stdio.h>
#include <stdlib.h>
int main(void) {
	// your code goes here
	//int a[10000000];
  int size = 10000000000;
    int *a = (int*) malloc(size * sizeof(int));
    	printf("%x\n",a);
	return 0;
}
```

```
~$ ./a.out
b43fc010
~$
```

stdout

```
ac398010
```

https://ideone.com/vqVO4I

Dynamic Array

- Dynamic arrays are a powerful data structure in programming that allows for creating and manipulating arrays of varying sizes during runtime.
- In C, the most commonly used memory allocation functions are **`malloc()`**, **`calloc()`**, and **`realloc()`**.

Dynamic Array

```c
#include <stdio.h>
#include <stdlib.h>
int main() {
    int size = 5;
    int *arr = (int*) malloc(size * sizeof(int));
    int i;

        for(i = 0; i< size; i++) {
        arr[i] = i;
        }
    // Add a new element to the array
        size++;
        arr = (int*) realloc(arr, size * sizeof(int));
        arr[size-1] = i;

```

https://ideone.com/0bf596

Dynamic Array

```
    for(i = 0; i< size; i++) {
        printf("%d ", arr[i]);
    }

    free(arr);

    return 0;
}
```

stdout

```
0 1 2 3 4 5
```

Dynamic Array

```c
#include <stdio.h>
#include <stdlib.h>
int main() {
    int size = 5;
    int *arr = (int*) malloc(size * sizeof(int));
    int i;

        for(i = 0; i< size; i++) {
        arr[i] = i;
        }
    // Add a new element to the array
        size++;
        arr = (int*) realloc(arr, size * sizeof(int));
        arr[size-1] = i;

```

https://ideone.com/4U59Q7

Dynamic Array

```
    for(i = 0; i< size; i++) {
        printf("%d ", arr[i]);
    }

    free(arr);

    printf("\n");

    for(i = 0; i< size; i++) {
        printf("%d ", arr[i]);
    }

    return 0;
}
```

stdout

```
0 1 2 3 4 5
0 0 -1289768944 21846 4 5
```

Thank You!