Write a shell script and C program to perform the following string operations:

a) To extract a substring from a given string.

>Shell Script:

```
  UW PICO 5.09                                                File: string.sh

str="Welcome to Miet."
echo "Total characters in string: ${#str}"

echo "Extracting list of 10 characters of string"
substr="${str:0:10}"
echo "$substr"

echo "Extracting from specific character onwards"
substr="${str:11}"
echo "$substr"

echo "Extracting characters between given range"
substr="${str:11:6}"
echo "$substr"

echo "Extracting characters by give range in negative"
substr="${str:-1}"
echo "$substr"
```

>C-program:

```
  UW PICO 5.09                                                File: string.c

#include <stdio.h>
int main()
{
        char str[50]="Welcome to Miet.";
        printf("Total characters in string: 16");
        printf("\n\n");
        // character extraction
        printf("Extracting list of 10 characters of string:-");{
        for (int i = 0; i<=10; i++) {
                if (str[i] != ' ') {
                        printf("%c", str[i]);
                }
        }
        }
        printf("\n\n");
        printf("Extracting from specific character onwards:-");{
        for (int i = 10; i<=15; i++){
                if (str[i] != ' ') {
                        printf("%c", str[i]);
                }
        }
        }
        printf("\n\n");
        printf("Extracting characters between given range:-");{
        for (int i = 4; i<=13; i++) {
                if (str[i] != ' ') {
                        printf("%c", str[i]);
                }
        }
        }
        printf("\n\n");
        printf("Extracting characters by giving range in negative:-");{
        for (int i = -1; i<=16; i++) {
                if (str[i] != ' ') {
                        printf("%c", str[i]);
                }
        }
        }
        printf("\n\n");
        return 0;
}
```

>Output using time command for both c program and shell script.

```
smarty@Raghavs-Air ~ % nano string.sh
smarty@Raghavs-Air ~ % time ./a.out
Total characters in string: 16

Extracting list of 10 characters of string:-Welcometo

Extracting from specific character onwards:-Miet.

Extracting characters between given range:-ometoMie

Extracting characters by giving range in negative:-WelcometoMiet.

./a.out  0.00s user 0.00s system 50% cpu 0.005 total
smarty@Raghavs-Air ~ % nano string.c
smarty@Raghavs-Air ~ % gcc string.c
smarty@Raghavs-Air ~ % time ./a.out
Total characters in string: 16

Extracting list of 10 characters of string:-Welcometo

Extracting from specific character onwards:-Miet.

Extracting characters between given range:-ometoMie

Extracting characters by giving range in negative:-WelcometoMiet.

./a.out  0.00s user 0.00s system 1% cpu 0.408 total
smarty@Raghavs-Air ~ %
```

b) To find the length of a given string.

>Shell Script:

```
  UW PICO 5.09                                                File: strlen.sh

str="WELCOME to Miet"
echo "The total no of char in the string are: ${#str}"
```

>C-Program:

```
  UW PICO 5.09                                                File: strlen.c

#include <stdio.h>
#include <string.h>

int main() {
    char str[1000];


    printf("Enter the string: ");
    scanf("%s", str);


    int length;


    length = strlen(str);


    printf("The length of the string is %d ", length);
    printf("\n\n");

    return 0;
}
```

>Output using time command for both c program and shell script.

```
smarty@Raghavs-Air ~ % nano strlen.sh
smarty@Raghavs-Air ~ % chmod +x strlen.sh
smarty@Raghavs-Air ~ % time ./strlen.sh
The total no of char in the string are: 16
./strlen.sh  0.00s user 0.01s system 69% cpu 0.016 total
smarty@Raghavs-Air ~ % nano strlen.c
smarty@Raghavs-Air ~ % gcc strlen.c
smarty@Raghavs-Air ~ % time ./a.out
Enter the string: RaghavSharma
The length of the string is 12

./a.out  0.00s user 0.00s system 0% cpu 20.175 total
smarty@Raghavs-Air ~ %
```