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Question-1

List out all the standard Library functions: I/O functions, string and character functions, mathematical functions, time, date and localization functions, utility functions, wide-character functions.

I/O functions

fprintf ( )	**write data into a file**
fscanf ( )	**read data from a file**
putc ( )/ fputc()	**write a character into a file**
getc ( ) /fgetc()	**read a character from a file**
putw ( )	**write a number into a file**
getw ( )	**read number from a file**
fputs ( )	**write a string into a file**
fgets ( )	**read a string from a file**
fread()	**read an entire record from a file**
fwrite()	**write an entire record into a file**

String and Character functions

strlen()	**computes string's length**
strcpy()	**copies a string to another**
strcat()	**concatenates(joins) two strings**
strcmp()	**compares two strings**
strlwr()	**converts string to lowercase**
strupr()	**converts string to uppercase**

Mathematical functions

ceil(number)	rounds up the given number. It returns the integer value which is greater than or equal to given number.
floor(number)	rounds down the given number. It returns the integer value which is less than or equal to given number.
sqrt(number)	returns the square root of given number.
pow(base, exponent)	returns the power of given number.
abs(number)	returns the absolute value of given number.

Time and Date functions

size_t	This is the unsigned integral type and is the result of the sizeof keyword.
clock_t	This is a type suitable for storing the processor time.
time_t is	This is a type suitable for storing the calendar time.
struct tm	This is a structure used to hold the time and date.

Localization functions

<locale.h>	Localization Functions
localeconv	Get Locale Conventions
setlocale	Set Locale

Utility functions

abort - Abnormal termination of a program
abs - Integer absolute value (magnitude)
assert - Macro for Debugging Diagnostics
atexit - Request execution of functions at program exit
atof - String to double or float
atoi - String to integer
bsearch - Binary search
calloc - Allocate space for arrays
div - Divide two integers
ecvtbuf - Double or float to string of digits
ecvt - Double or float to string of digits (malloc result)
__env_lock - Lock environment list for getenv and setenv
gvcvt - Format double or float as string
exit - End program execution
getenv - Look up environment variable
labs - Long integer absolute value (magnitude)
ldiv - Divide two long integers
malloc - Allocate memory
realloc - Reallocate memory
free - Free previously allocated memory

mallinfo - Get information about allocated memory
__malloc_lock - Lock memory pool for malloc and free
mbstowcs - Minimal multibyte string to wide string converter
mblen - Minimal multibyte length

Wide-Character functions

Wide-Character string functions

wchar_t *wcscat(wchar_t *s1, const wchar_t *s2);	copies wide string that s2 points to, to the end of the wide string hat s1 points to.
wchar_t *wcschr(const wchar_t *s, wchar_t c);	searches the wide string s for the wide character c.
int wcscmp(const wchar_t *s1, const wchar_t *s2);	compares two wide strings that s1 and s2 point to.
int wcscoll(const wchar_t *s1, const wchar_t *s2);	compares two wide strings s1 and s2 using current locale's collating order.
wchar_t *wcscpy(wchar_t *s1, const wchar_t s2);	copies the wide string that s2 points to , to the location that s1 points to.
size_t wcscspn(const wchar_t *s1, const wchar_t *s2);	searches for the very first element of s1 that equals any one of the elements of s2.
size_t wcslen(const wchar_t *s);	returns the number of wide characters(excluding the terminating null wide character) in the wide string that s points to.

Wide-Character array function

wchar_t *wmemchr(const wchar_t *s, wchar_t c, size_t n);	**searches for the first element of the array of size n and that s points to, that equals c.**
int wmemcmp(const wchar_t *s1, const wchar_t *s2, size_t n);	**compares the successive elements from two arrays that s1 and s2 point to, until it finds elements that are not equal.**
wchar_t *wmemcpy(wchar_t *s1, const wchar_t *s2, size_t n);	**copies n wide characters from the array pointed to by s2 to the wide characters in an array pointed to by s1. If objects in s1 and s2 overlap, the behavior is undefined.**
wchar *wmemmove(wchar_t *s1, const wchar_t *s2, size_t n);	**works like wmemcpy function even if objects in arrays s1 and s2 overlap.**
wchar_t *wmemset(wchar_t *s, wchar_t c, size_t n)	**sets the first n elements of the array that s points to, to the wide character c.**

Conversion functions

wint_t btowc(int c);	**returns the result after converting c into its wide character equivalent and on error returns WEOF.**
int wctob(wint_t c);	**returns the one byte or multibyte equivalent of c and on error returns WEOF.**

Wide-Character I/O functions

wint_t fgetwc(FILE *stream);	**reads a wide character from a file.**
wchar_t *fgetws(wchar_t *s, int n, FILE *stream);	**reads a wide character string from a file.**
wint_t fputwc(wchar_t *c, FILE *stream);	**writes a wide character to a file.**
int fputws(const wchar_t *s, FILE *stream);	**writes a wide string to a file.**
int fwprintf(FILE *stream, const wchar_t format,...);	**first generates a formatted text and then writes it to the file.**
int fwscanf(FILE *stream, const wchar_t format,...);	**reads formatted text from a file.**
wint_t getwc(FILE*stream);	**reads a wide character from a file.**
wint_t getwchar()	**reads a wide character from stdin.**
wint_t putwc(wchar_t c, FILE *stream);	**writes a wide character to a file.**
wint_t putwchar(wchar_t c);	**writes a wide character to stdout.**

Question-2

Write a C program to copy up to n characters from the string pointed to, str1 to str2

Code

```c
#include <stdio.h>
#include <conio.h>

int main()
{
    int n;
    printf("Enter n : ");
    scanf("%d",&n);
    fflush(stdin);

    char string1[100];
    char string2[n];

    char *ptr1 = string1;
    char *ptr2 = string2;

    printf("Enter any string : ");
    gets(string1);

    while(n>0){
        *(ptr2) = *(ptr1);
            ptr1++;
            ptr2++;
        n--;
    }
    *(ptr2++) = '\0';

    printf("First string = %s\n", string1);
    printf("Second string = %s\n", string2);

    return 0;
}
```

Output

```
Enter n : 9
Enter any string : Prashanth from Seattle
First string = Prashanth from Seattle
Second string = Prashanth

Process returned 0 (0x0)   execution time : 19.529 s
Press any key to continue.
```

Question-3

Write a C program to calculate the length of the initial segment of str1 which consists entirely of characters in str2.

Code

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

int main () {
   int length;
   char str1[100];
   char str2[100];
   printf("Enter string 1 : ");     gets(str1);
   printf("Enter string 2 : ");     gets(str2);
   length = strspn(str1, str2);

   printf("The length of matching initial segment : %d\n", length );
   return(0);
}

```

Output

```
Enter string 1 : Prashanth from Seattle
Enter string 2 : Prashanth
The length of matching initial segment : 9

Process returned 0 (0x0)   execution time : 7.780 s
Press any key to continue.
```

Question-4

Write a C program to take a float value and compute the floor for the declared value and rounds to the next value 10.

Code

```c
#include <stdio.h>
#include <math.h>

int nextMultipleof10(float value)
{
    int floorValue = (int)value;
    while (floorValue % 10 != 0)
        floorValue += 1;
    return floorValue;
}
int main()
{
    float value;
    int ans;
    printf("Enter Float: ");
    scanf("%f", &value);
    value=floor(value);
    ans = nextMultipleof10(value);
    printf("Next Multiple of %0.2f is %d", value, ans);
}
```

Output

```
Enter Float: 87.23
Next Multiple of 87.00 is 90
Process returned 0 (0x0)   execution time : 6.338 s
Press any key to continue.
```

Question-5

5. What will be the output of the following C code, if the system date is 5/24/2021?

```
#include<stdio.h>
#include<time.h>
int main()
{
   struct tm *local;
   time_t t;
   t=time(NULL);
   local=localtime(&t);
   printf("%d",local->tm_mday);
   return 0;
}
```

Code

```c
#include<stdio.h>
#include<time.h>

int main()
  {
      struct tm *local;
      time_t t;
      t=time(NULL);
      local=localtime(&t);

      printf("%s",asctime(local));

      printf("Present day : %d",local->tm_mday);              /* day of the month, range 1 to 31  */
      printf("\nPresent month : %d",(local->tm_mon) + 1);    /* month, range 0 to 11             */

     return 0;
  }

```

Output

```
Fri May 28 18:39:45 2021
Present day : 28
Present month : 5
Process returned 0 (0x0)   execution time : 0.333 s
Press any key to continue.
```

Answer to the question → 24

Question-6

Write a C program to take a string input and print the float value of the input.

Code

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

int main() {
	char num1[30];
	printf("Enter the float number : ");
	scanf("%s",num1);

	printf("%s--> %f",num1,atof(num1));		// method-1
	printf("\n%s --> %f",num1,strtof(num1, NULL)); // method-2
}
```

Output

```
Enter the float number : 67.65
67.65--> 67.650000
67.65 --> 67.650002
Process returned 0 (0x0)   execution time : 3.775 s
Press any key to continue.
```

Question-7

Write a C program to take a Wide-Character str1 and copy to another string str2 and also print the length of the string.

Code

```c
#include<stdio.h>
#include<wchar.h>

int main() {
    wchar_t src[30]    = L"Seattle";
    wchar_t dest[30] = L"Texas";
    wchar_t * ptr;

    printf("Before copying ");
    printf("\nSource string : \%ls\n",src);
    printf("Destination string : \%ls\n",dest);

    printf("\nLength of the source string : %i\n",wcslen(src));
    printf("Length of the source string : %i\n",wcslen(dest));

    printf("\nProcess of copying ......\n");
    ptr = wcscpy(dest,src);

    printf("\nAfter copying ");
    printf("\nSource string : \%ls\n",src);
    printf("Destination string : \%ls\n",dest);

    printf("\nLength of the source string : %i\n",wcslen(src));
    printf("Length of the source string : %i\n",wcslen(dest));

    return 0;
}
```

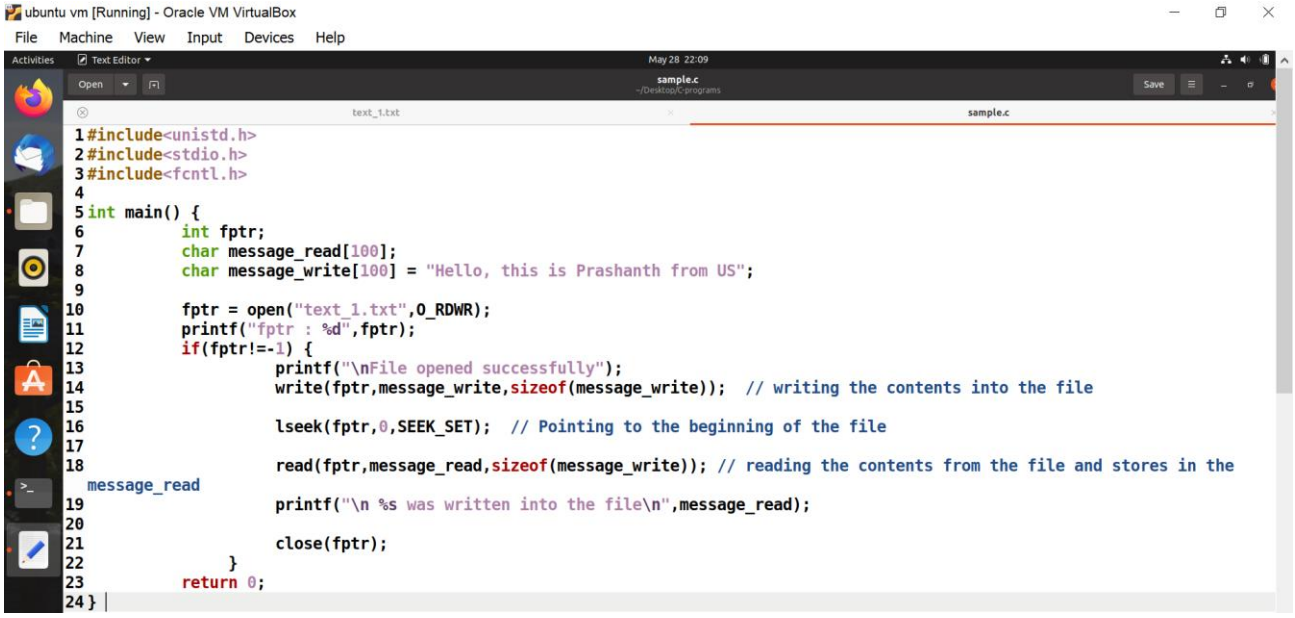
Output

```
Before copying
Source string : Seattle
Destination string : Texas

Length of the source string : 7
Length of the source string : 5

Process of copying ......

After copying
Source string : Seattle
Destination string : Seattle

Length of the source string : 7
Length of the source string : 7

Process returned 0 (0x0)   execution time : 0.299 s
Press any key to continue.
```

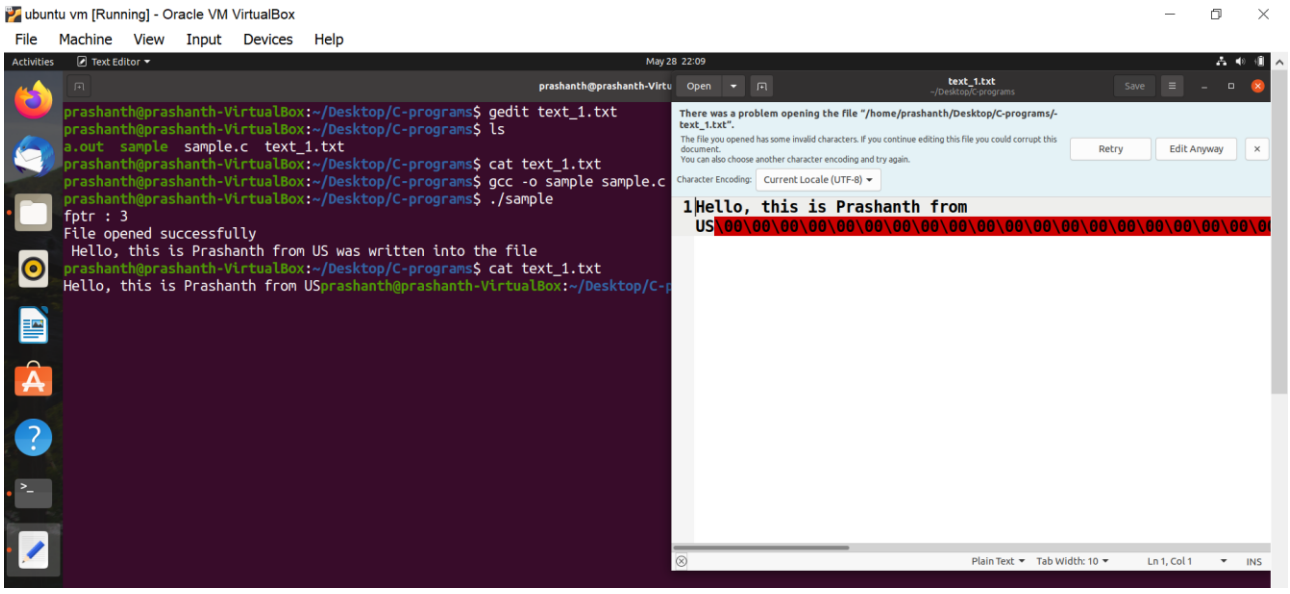
Question-8

Write a Unix C program to read the content from a file.

Code



Output



Source Code (git-hub link) → **https://github.com/PrashanthSingaravelan/winter_semester/tree/main/CSE2010%20Advanced%20C%20programming/Lab%20Assignments/Assignment_6**

Reference

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- https://www.tutorialspoint.com/wide-char-and-library-functions-in-cplusplus
- https://www-user.tu-chemnitz.de/~heha/petzold/ch02c.html
- https://www.ibm.com/docs/en/i/7.2?topic=functions-wcscpy-copy-wide-character-strings#wcscpy
- https://www.ibm.com/docs/en/ssw_ibm_i_72/rtref/wcslen.htm#wcslen