Character Strings: Q1 (processString)

Write a C function that accepts a string str and returns the total number of vowels totVowels and digits totDigits in that string to the caller via call by reference. The function prototype is given as follows:

void processString(char *str, int *totVowels, int *totDigits);

Sample input and output sessions:

Test Case 1:

Enter the string:

I am one of the 400 students in this class.

Total vowels = 11
Total digits = 3

Test Case 2:

Enter the string:

I am a boy.

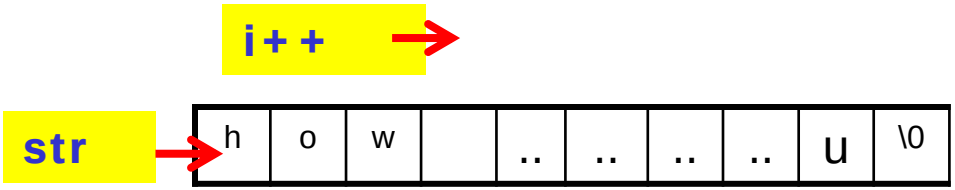
Total vowels = 4
Total digits = 0

Character Strings: Q1 (processString)

```
#include <stdio.h>
#include <string.h>
void processString(char *str, int *totVowels,
int *totDigits);
int main()
{
  char str[50], *p;
  int totVowels, totDigits;

  printf("Enter the string: \n");
  fgets(str, 50, stdin);
  if (p=strchr(str,'\n')) *p = '\0';
  processString(str, &totVowels, &totDigits);
  printf("Total vowels = %d\n", totVowels);
  printf("Total digits = %d\n", totDigits);
  return 0;
}
```

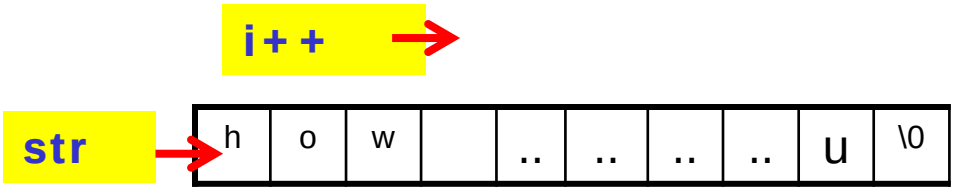
Character Strings: Q1 (processString)

```
void processString(char *str, int *totVowels, int *totDigits)
{
  int i, size;

  *totVowels=0;
  *totDigits=0;
  i=0; size=0;
  while (str[i]!='\0'){
    size++;
    i++;
  }
  for (i=0; i < size; i++) {
    if (str[i] == 'a' || str[i] == 'e' ||
        str[i] == 'i' ||  str[i] == 'o' ||
         str[i] == 'u' || str[i] == 'A' ||
         str[i] == 'E' || str[i] == 'I' ||
         str[i] == 'O' || str[i] == 'U')
      (*totVowels)++;
    else if ( str[i] >= '0' &&  str[i] <= '9')
      (*totDigits)++;
  }
}
```



Character Strings: Q1 (processString)

```
/* Another version */
void processString2(char *str, int *totVowels, int *totDigits)
{
  int i,size;

  *totVowels = 0, *totDigits = 0;
  i=0; size=0;
  while (str[i]!='\0'){
    size++;
    i++;
  }
  for (i=0; i < size; i++) {
    if (*(str+i) == 'a' || *(str+i) == 'e' ||
        *(str+i) == 'i' || *(str+i) == 'o' ||
        *(str+i) == 'u' || *(str+i) == 'A' ||
        *(str+i) == 'E' || *(str+i) == 'I' ||
        *(str+i) == 'O' || *(str+i) == 'U')
      (*totVowels)++;
    else if ( *(str+i) >= '0' &&  *(str+i) <= '9')
      (*totDigits)++;
  }
}
```



Character Strings – Q2 (stringncpy)

Write a C function **stringncpy()** that

1. copies not more than ***n*** characters (characters that follow a null character are not copied) from the array pointed to by ***s2*** to the array pointed to by ***s1***.
2. If the array pointed to by *s2* is a string **shorter than** *n* characters, **null characters** are appended to the copy in the array pointed to by *s1*, until *n* characters in all have been written.

The stringncpy() **returns** the value of ***s1***.

The function prototype:

char *stringncpy(char * s1, char * s2, int n);

In addition, write a C program to test the stringncpy function.

Your program should read the string and the target *n* characters from the user and then call the function with the user input.

In this program, you are not allowed to use any functions from the C standard String library.

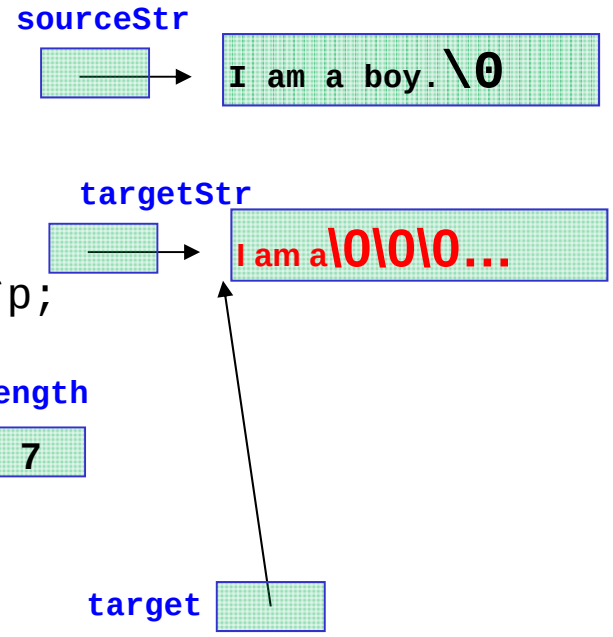
Sample input and output sessions:

(1) Test Case 1
Enter the string:
I am a boy.
Enter the number of characters:
7
stringncpy(): I am a

(2) Test Case 2
Enter the string:
I am a boy.
Enter the number of characters:
21
stringncpy(): I am a boy.

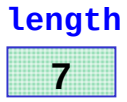
Character Strings – Q2 (stringncpy)

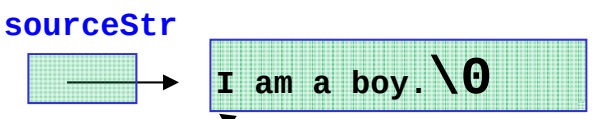
```
#include <stdio.h>
#include <string.h>
char *stringncpy(char *s1, char *s2, int n);
int main()
{
   char targetStr[40], sourceStr[40], *target, *p;
   int length;

   printf("Enter the string: \n");
   fgets(sourceStr, 40, stdin);
   if (p=strchr(sourceStr,'\n')) *p = '\0';
   printf("Enter the number of characters: \n");
   scanf("%d", &length);
   target = stringncpy(targetStr, sourceStr, length);
   printf("stringncpy(): %s\n", target);
   return 0;
}
```

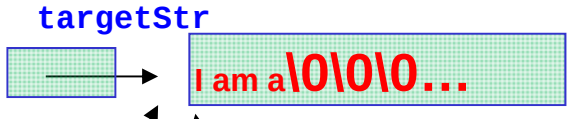


Character Strings – Q2 (stringncpy)

```
#include <stdio.h>
char *stringncpy(char *s1, char *s2, int n);
int main()
{
```

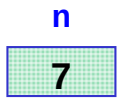




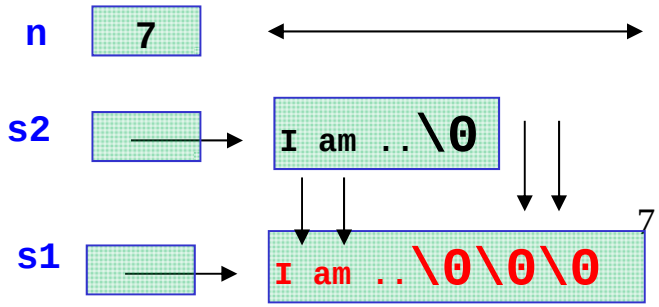



```
 target = stringncpy(targetStr, sourceStr, length);
}
```


```
char *stringncpy(char *s1, char *s2, int n){
   int k, h;
   for (k = 0; k < n; k++){
      if (s2[k] != '\0')
         s1[k] = s2[k];
      else
         break;
   }
   s1[k] = '\0';
   // to append '\0' after copying if s2 length is shorter than n
   for (h = k; h < n; h++)
      s1[h] = '\0';
   return s1;
}
```



Note: the last for loop in the code will not affect the correctness of the program; it only follows the question specification.



Character Strings: Q3 (stringcmp)

Write a C function that compares the string pointed to by ***s1*** to the string pointed to by ***s2***. If the string pointed to by *s1* is greater than, equal to, or less than the string pointed to by *s2*, then it returns 1, 0 or –1 respectively. Write the code for the function without using any of the standard C string library functions. The function prototype is given as follows:

int stringcmp(char *s1, char *s2);

Sample input and output sessions:

Test Case 1:

Enter a source string: *abc*

Enter a target string: *abc*

stringcmp(): equal

Test Case 2:

Enter a source string: *abcdefg*

Enter a target string: *abcde123*

stringcmp(): greater than

Test Case 3:

Enter a source string: *abc123*

Enter a target string: *abcdef*

stringcmp(): less than

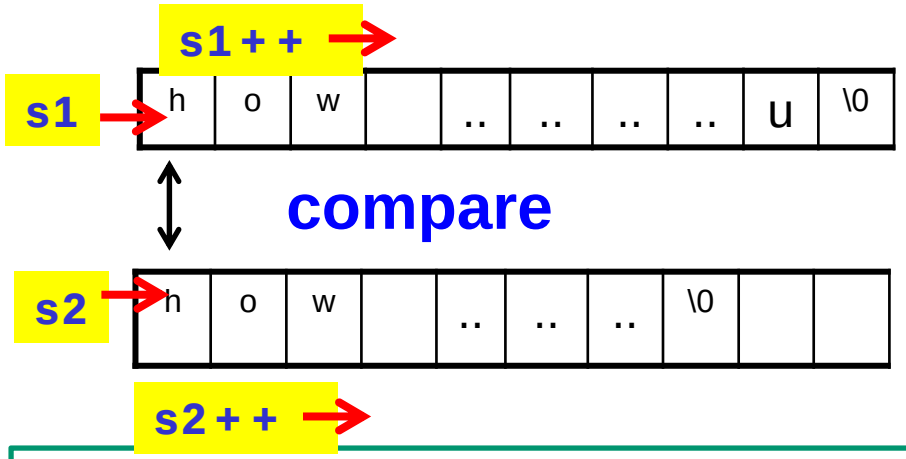
Test Case 4:

Enter a source string: *abcdef*

Enter a target string: *abcdefg*

stringcmp(): less than

Character Strings: Q3 (stringcmp)



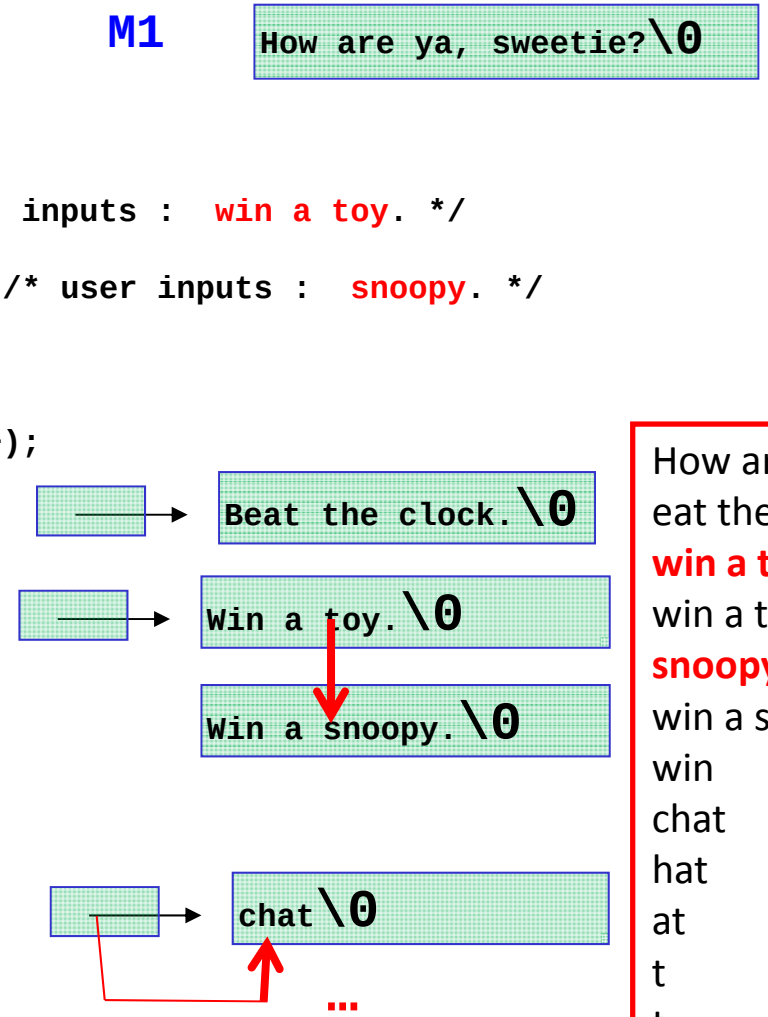

```
/* return 0 if the two strings (based on
ASCII values) are the same;
return 1 or -1 if one string is larger/smaller
than another string in alphabetical order*/
#include <stdio.h>
int strcmp(char * s1, char * s2);
int main()
{
   char source[80], target[80], *p;
   fgets(source); if ( p=strchr(str,'\n') ) *p = '\0';
   fgets(target); if ( p=strchr(str,'\n') ) *p = '\0';
   printf("strcmp=%d",strcmp(source, target));
   return 0;
}
```

```
int strcmp(char *s1, char *s2)
 {
   while (1) {
      if (*s1 == '\0' && *s2 == '\0')
         return 0;
      else if (*s1 == '\0')
         return -1;
      else if (*s2 == '\0')
         return 1;
      else if (*s1 < *s2)
         return -1;
      else if (*s1 > *s2)
         return 1;

      s1++;
      s2++;
   }
 }
```

Comparison based on ASCII value

Character Strings – Q4

```
#include  <stdio.h>
#define  M1  "How are ya, sweetie?"
char M2[40] = "Beat the clock.";
char *M3 = "chat";
int main()
{
   char words[80];
   printf(M1);
   puts(M2);
   puts(M2+1);
   gets(words);   /* user inputs :  win a toy. */
   puts(words);
   scanf("%s", words+6); /* user inputs :  snoopy. */
   puts(words);
   words[3] = '\0';
   puts(words);
   while (*M3)  puts(M3++);
   puts(--M3);
   puts(--M3);
   M3 = M1;
   puts(M3);
   return 0;
}
```



How are ya, sweetie?Beat the clock.
eat the clock.
win a toy.
win a toy.
snoopy.
win a snoopy.
win
chat
hat
at
t
t
at
How are ya, sweetie?