

# SE1012 — Programming Methodology

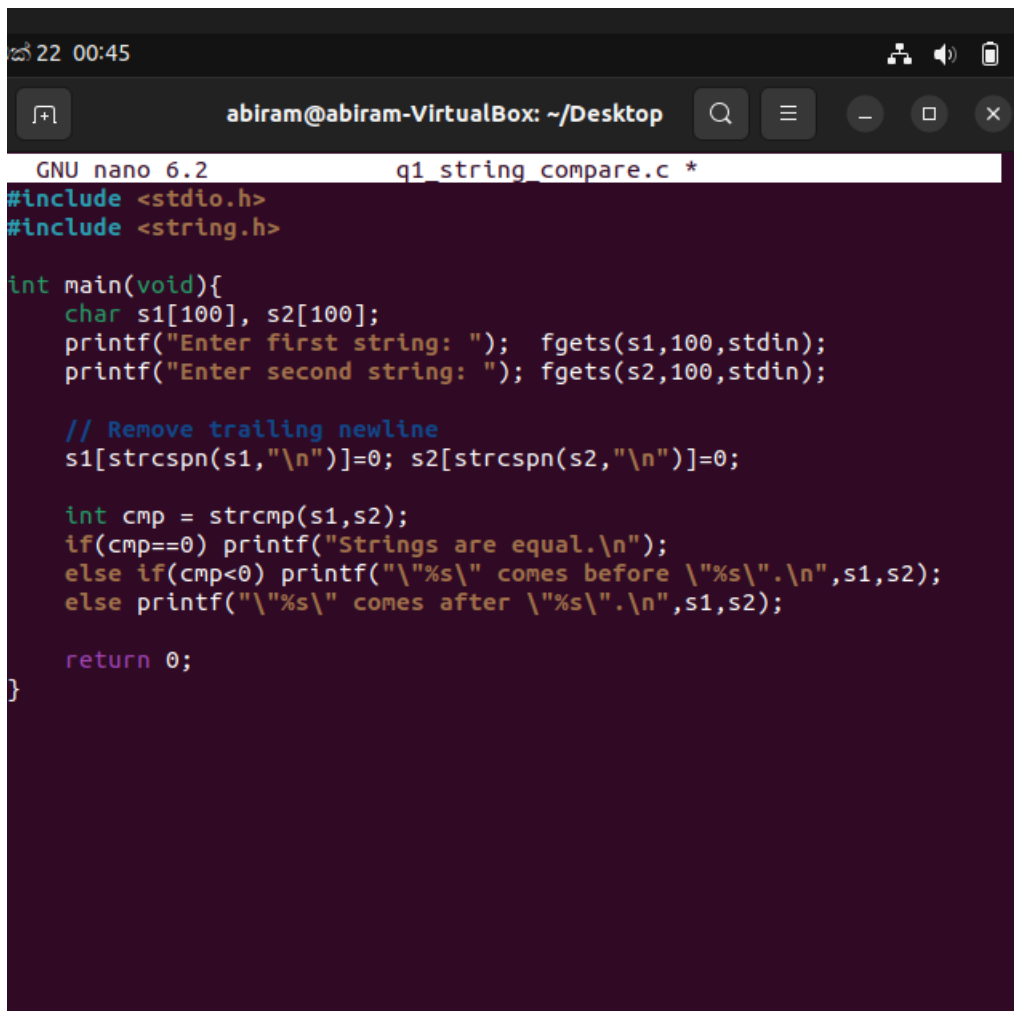
## Lab 10—Strings and Recursion

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Q1)

Code



The screenshot shows a terminal window with a dark background. At the top, the title bar reads 'abiram@abiram-VirtualBox: ~/Desktop'. Below the title bar, the terminal shows the GNU nano 6.2 editor interface. The file being edited is 'q1\_string\_compare.c'. The code is as follows:

```
GNU nano 6.2 q1_string_compare.c *
#include <stdio.h>
#include <string.h>

int main(void){
    char s1[100], s2[100];
    printf("Enter first string: "); fgets(s1,100,stdin);
    printf("Enter second string: "); fgets(s2,100,stdin);

    // Remove trailing newline
    s1[strcspn(s1,"\n")]=0; s2[strcspn(s2,"\n")]=0;

    int cmp = strcmp(s1,s2);
    if(cmp==0) printf("Strings are equal.\n");
    else if(cmp<0) printf("\"%s\" comes before \"%s\".\n",s1,s2);
    else printf("\"%s\" comes after \"%s\".\n",s1,s2);

    return 0;
}
```

Output

```
22 00:46
abiram@abiram-VirtualBox: ~/Desktop
abiram@abiram-VirtualBox:~/Desktop$ nano q1_string_compare.c
abiram@abiram-VirtualBox:~/Desktop$ gcc q1_string_compare.c -o q1 &&
./q1
Enter first string: we
Enter second string: er
"we" comes after "er".
abiram@abiram-VirtualBox:~/Desktop$
```

Q2)

Code

```
22 00:47
GNU nano 6.2 q2_array_of_pointers.c *
#include <stdio.h>

int main(void){
    const char *days[] = {"Monday","Tuesday","Wednesday","Thursday",>
    int n = sizeof(days)/sizeof(days[0]);
    printf("Days of the week:\n");
    for(int i=0;i<n;i++)
        printf("%d: %s\n", i+1, days[i]);

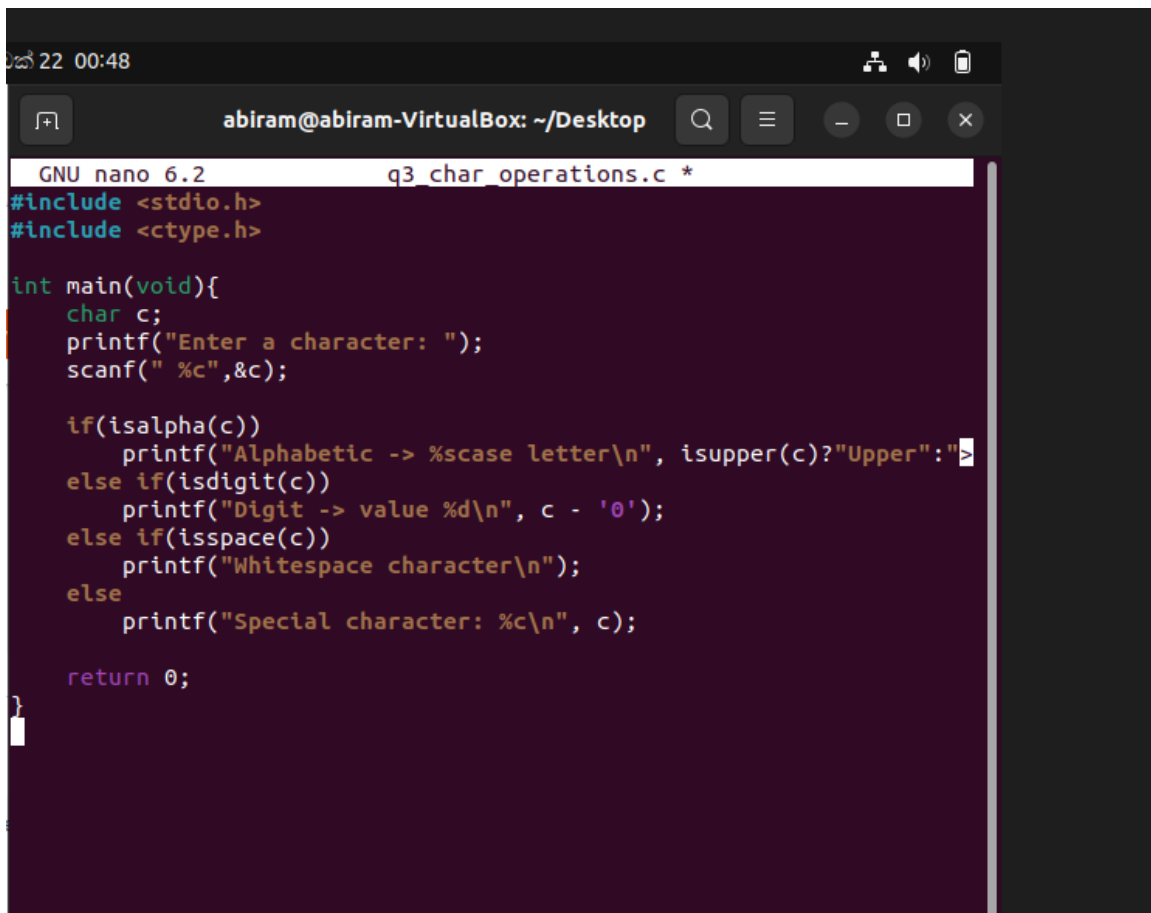
    return 0;
}
```

Output

```
22 00:47
abiram@abiram-VirtualBox: ~/Desktop
abiram@abiram-VirtualBox:~/Desktop$ nano q1_string_compare.c
abiram@abiram-VirtualBox:~/Desktop$ gcc q1_string_compare.c -o q1 &&
./q1
Enter first string: we
Enter second string: er
"we" comes after "er".
abiram@abiram-VirtualBox:~/Desktop$ nano q2_array_of_pointers.c
abiram@abiram-VirtualBox:~/Desktop$ gcc q2_array_of_pointers.c -o q2
&& ./q2
Days of the week:
1: Monday
2: Tuesday
3: Wednesday
4: Thursday
5: Friday
6: Saturday
7: Sunday
abiram@abiram-VirtualBox:~/Desktop$
```

Q3)

Code



The image shows a terminal window with a dark background. At the top, the system clock shows '22 00:48'. The terminal title bar reads 'abiram@abiram-VirtualBox: ~/Desktop'. The nano editor is open, editing a file named 'q3\_char\_operations.c'. The code is as follows:

```
GNU nano 6.2 q3_char_operations.c *
#include <stdio.h>
#include <ctype.h>

int main(void){
    char c;
    printf("Enter a character: ");
    scanf(" %c",&c);

    if(isalpha(c))
        printf("Alphabetic -> %scase letter\n", isupper(c)?"Upper":>
    else if(isdigit(c))
        printf("Digit -> value %d\n", c - '0');
    else if(isspace(c))
        printf("Whitespace character\n");
    else
        printf("Special character: %c\n", c);

    return 0;
}
```

Output

```
22 00:50
abiram@abiram-VirtualBox: ~/Desktop
abiram@abiram-VirtualBox:~/Desktop$ nano q1_string_compare.c
abiram@abiram-VirtualBox:~/Desktop$ gcc q1_string_compare.c -o q1 &&
./q1
Enter first string: we
Enter second string: er
"we" comes after "er".
abiram@abiram-VirtualBox:~/Desktop$ nano q2_array_of_pointers.c
abiram@abiram-VirtualBox:~/Desktop$ gcc q2_array_of_pointers.c -o q2
&& ./q2
Days of the week:
1: Monday
2: Tuesday
3: Wednesday
4: Thursday
5: Friday
6: Saturday
7: Sunday
abiram@abiram-VirtualBox:~/Desktop$ nano q3_char_operations.c
abiram@abiram-VirtualBox:~/Desktop$ gcc q3_char_operations.c -o q3 &&
./q3
Enter a character: adef
Alphabetic -> Lowercase letter
abiram@abiram-VirtualBox:~/Desktop$ S
```

Q4)

Code

```
22 00:50
abiram@abiram-VirtualBox: ~/Desktop
GNU nano 6.2 q4_using_strings.c *
#include <stdio.h>
#include <string.h>
#include <ctype.h>

int main(void){
    char str[200];
    printf("Enter a sentence: ");
    fgets(str,sizeof str,stdin);
    str[strcspn(str,"\n")] = 0;

    // Reverse
    int n=strlen(str);
    printf("Reversed: ");
    for(int i=n-1;i>=0;i--) putchar(str[i]);
    printf("\n");

    // Count vowels
    int v=0;
    for(int i=0;i<n;i++){
        char c=tolower((unsigned char)str[i]);
        if(c=='a' || c=='e' || c=='i' || c=='o' || c=='u') v++;
    }
    printf("Number of vowels = %d\n", v);
    return 0;
}
```

Output

```
02 22 00:51
abiram@abiram-VirtualBox: ~/Desktop
abiram@abiram-VirtualBox:~/Desktop$ nano q1_string_compare.c
abiram@abiram-VirtualBox:~/Desktop$ gcc q1_string_compare.c -o q1 &&
./q1
Enter first string: we
Enter second string: er
"we" comes after "er".
abiram@abiram-VirtualBox:~/Desktop$ nano q2_array_of_pointers.c
abiram@abiram-VirtualBox:~/Desktop$ gcc q2_array_of_pointers.c -o q2
&& ./q2
Days of the week:
1: Monday
2: Tuesday
3: Wednesday
4: Thursday
5: Friday
6: Saturday
7: Sunday
abiram@abiram-VirtualBox:~/Desktop$ nano q3_char_operations.c
abiram@abiram-VirtualBox:~/Desktop$ gcc q3_char_operations.c -o q3 &&
./q3
Enter a character: adef
Alphabetic -> Lowercase letter
abiram@abiram-VirtualBox:~/Desktop$ nano q4_using_strings.c
abiram@abiram-VirtualBox:~/Desktop$ gcc q4_using_strings.c -o q4 && .
/q4
Enter a sentence: asddbhb auwdi iuaf i
Reversed: i faui idwua bhbddsa
Number of vowels = 8
abiram@abiram-VirtualBox:~/Desktop$
```

Q5)

Code

```
22 00:52
abiram@abiram-VirtualBox: ~/Desktop
GNU nano 6.2 q5 nature of recursion.c *
#include <stdio.h>

void countdown(int n){
    if(n==0){
        printf("Blast off!\n");
        return;
    }
    printf("%d...\n",n);
    countdown(n-1);
}

int main(void){
    int n;
    printf("Enter starting number: ");
    scanf("%d",&n);
    countdown(n);
    return 0;
}
```

Output



22 00:53

abiram@abiram-VirtualBox: ~/Desktop

```
abiram@abiram-VirtualBox:~/Desktop$ nano q1_string_compare.c
abiram@abiram-VirtualBox:~/Desktop$ gcc q1_string_compare.c -o q1 &&
./q1
Enter first string: we
Enter second string: er
"we" comes after "er".
abiram@abiram-VirtualBox:~/Desktop$ nano q2_array_of_pointers.c
abiram@abiram-VirtualBox:~/Desktop$ gcc q2_array_of_pointers.c -o q2
&& ./q2
Days of the week:
1: Monday
2: Tuesday
3: Wednesday
4: Thursday
5: Friday
6: Saturday
7: Sunday
abiram@abiram-VirtualBox:~/Desktop$ nano q3_char_operations.c
abiram@abiram-VirtualBox:~/Desktop$ gcc q3_char_operations.c -o q3 &&
./q3
Enter a character: adef
Alphabetic -> Lowercase letter
abiram@abiram-VirtualBox:~/Desktop$ nano q4_using_strings.c
abiram@abiram-VirtualBox:~/Desktop$ gcc q4_using_strings.c -o q4 && .
/q4
Enter a sentence: asddbhb auwdi iuaf i
Reversed: i faui idwua bhbddsa
Number of vowels = 8
abiram@abiram-VirtualBox:~/Desktop$ nano q5_nature_of_recursion.c
abiram@abiram-VirtualBox:~/Desktop$ gcc q5_nature_of_recursion.c -o q
5 && ./q5
Enter starting number: sdbhr
Blast off!
abiram@abiram-VirtualBox:~/Desktop$
```