C Programming QB Module 3 Part A Solutions for CIE-1

@ Ujjwal Acharya

1. Define what an array is and write the syntax to declare an array.

> **Arrays** - a kind of data structure that can store a fixed-size sequential collection of elements of the same type. An array is used to store a collection of data, but it is often more recognized as a collection of variables of the same type.
> Syntax: data_type array_name[array_size];
> Example: int a[5];

2. Find the output of the following code.

```
#include <stdio.h>
void main()
{
int a[3][2] = {10, 20, 30, 40, 50, 60};
printf("%d", a[2][2]);
}
//Output: 0
```

3. Find the output of the following code.

```
#include <stdio.h>
void main()
{
int a[3][2] = {10, 20, 30, 40, 50, 60};
printf("%d", a[0][4]);
}
//Output: 50
```

4. Find the output of the following code.

```
#include <stdio.h>
#include <string.h>
void main() {
char s1[] = "hellow";
char s2[ ] ="helow";
int x;
x = strncmp(s1,s2,3);
printf("x = %d", x);
}
//Output: x=0
```

5. Find the output of the following code.

```
#include <stdio.h>
#include <string.h>
void main() {
char s1[] = "NEW DELHI";
char s2[] ="BANGALORE";
strncpy(s1,s2,4);
printf("%s", s1);
}
//Output: BANGDELHI
```

6. Find the output of the following code.

```
#include <stdio.h>
#include <string.h>
void main() {
char s1[] = "NEW DELHI";
char s2[] ="NEW";
printf("%d",strstr(s1,s2));
}
//Output: Error as the print statement is made to print in integers whereas the data type is character
```

7. Find the output of the following code.

```
#include <stdio.h>
void main() {
int a[4][3];
printf("%d",sizeof(a));
}
//Output: 48
```

8. Compare the string handling functions strcat() and strncat().

```
char *strcat( char *str1, const char *str2)
char *strncat( char *str1, const char *str2, size_t n)
```

where,

str1 = destination string or character array.

str2 = source string or character array

When `strcat( )` function is executed, string `str2` is appended to array `str1` and value of `str1` is returned.

When `strncat` function is executed, `n` characters of string `str2` are appended to array `str1` and the value of `str1` is returned.

9. Find the output of the following code.

```
#include <stdio.h>
void main() {
int i, j, a[][3]= {{1,2,3}, {4,5,6}};
for(i=0; i< 2; i++) {
for(j=0; j < 3;j++)
printf("%5d", a[i][j]);
printf("\n"); }
}
//Output: 1    2    3
//        4    5    6
```

10. Explain the following functions string handling functions. (i) strcmp() (ii). strrev()

1. strcmp()

— This string function is basically used for the purpose of comparing two strings.

— This string function compares two strings character by characters.

— Thus it gives result in three cases:

Case 1: If the first string > than the second string then, the result will be true.

Case 2: if first string < than second string then, the result will be false.

Case 3: If the first string = = to the second string then, the result will be zero.
Example:
char str1= —Gaurav‖;
char str2= —Arora‖;
char str3=strcmp(str1,str2);
printf(—%s‖,str3);

2. strrev()
— This string function is basically used for the purpose of reversing the string.
Example:
char str1= —Gaurav;
char str2[20];
str2= strrev(str2,str1);
printf(—%s‖,str2);

C Programming QB Module 3 Part B Solutions for CIE-1

@ Nishant, Vishnu and Ujjwal

1. Write C program to find the sum of given list of integers.

```
#include <stdio.h>

int main(){

int n,i,sum=0;
printf("Enter the number of integers: ");
scanf("%d",&n);
int arr[n];

for(i = 0; i<n; i++){

scanf("%d",&arr[i]);
sum += arr[i];
}
printf("%The sum of integers is : %d",sum);
return 0;

}
```

2. Write C program to find the largest and smallest number among a list of integers.

```
#include <stdio.h>

int main(){

int n,i;
printf("Enter the number of integers: ");
scanf("%d",&n);
int arr[n];
```

```
for(i = 0; i<n; i++)
    scanf("%d",&arr[i]);

int max = arr[0], min = arr[0];

for(i=0;i<n;i++){
    if(arr[i]>max)
        max = arr[i];
    if(arr[i]<min)
        min = arr[i];
}

printf("%The max of integers is : %d and min is: %d",max,min);
return 0;

}
```

3. Write C program to read a list of elements into an array and print the reverse of the list.

```
#include <stdio.h>

int main(){

int n,i;

printf("Enter number of elements: ");
scanf("%d",&n);

int a[n];

for(i=0;i<n;i++)
    scanf("%d",&a[i]);

printf("The reversed array is: ");
for(i=n-1;i>=0;i--)
    printf("%d ",a[i]);

return 0;
}
```

4. Write C program to read two matrices and find the addition and multiplication of two matrices.

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

```
int matrix_colle(int rows,int columns,int matrix[rows][columns]){
    for (int i = 0; i < rows; i++){
        for (int j = 0; j < columns; j++){
            printf("Enter values one by one:\n");
            scanf("%d", &matrix[i][j]);
        }
    }
    return matrix;
}

int main(){
    int m,n;
    printf("Enter number of rows and columns:\n");
    scanf("%d %d", &m, &n);
    int mat_1[m][n], mat_2[m][n], addi[m][n], mul[m][n];

    printf("Enter values for 1st matrix\n");
    matrix_colle(m, n, mat_1);

    printf("Enter values for 2nd matrix\n");
    matrix_colle(m, n, mat_2);

    for (int i = 0; i < m; i++){
        for (int j = 0; j < n; j++){
            addi[i][j] = mat_1[i][j] + mat_2[i][j];
        }
    }
    printf("The sum of both the matrices is:\n");
    for (int i = 0; i < m; i++){
        for (int j =0; j < n; j++){
            printf("%d   ", addi[i][j]);
        }
        printf("\n");
    }

    //Matrix Multiplication logic
    for (int i = 0; i < m; i++){
        for (int j = 0; j < n; j++){
            mul[i][j] = 0;
            for (int k = 0; k < n; k++){
                mul[i][j] += mat_1[i][k] * mat_2[k][j];
            }
        }
    }
    printf("The multiplication of the matrices is:\n");
    for (int i = 0; i < m; i++){
        for (int j = 0; j < n; j++){
            printf("%d   ", mul[i][j]);
        }
        printf("\n");
    }
}
```

5. Write C program to find the transpose of a matrix.

```
#include <stdio.h>
int main() {
  int a[10][10], transpose[10][10], r, c;
  printf("Enter rows and columns: ");
  scanf("%d %d", &r, &c);

  // asssigning elements to the matrix
  printf("\nEnter matrix elements:\n");
  for (int i = 0; i < r; ++i)
  for (int j = 0; j < c; ++j) {
    printf("Enter element a%d%d: ", i + 1, j + 1);
    scanf("%d", &a[i][j]);
  }

  // printing the matrix a[][]
  printf("\nEntered matrix: \n");
  for (int i = 0; i < r; ++i)
  for (int j = 0; j < c; ++j) {
    printf("%d  ", a[i][j]);
    if (j == c - 1)
    printf("\n");
  }

  // computing the transpose
  for (int i = 0; i < r; ++i)
  for (int j = 0; j < c; ++j) {
    transpose[j][i] = a[i][j];
  }

  // printing the transpose
  printf("\nTranspose of the matrix:\n");
  for (int i = 0; i < c; ++i)
  for (int j = 0; j < r; ++j) {
    printf("%d  ", transpose[i][j]);
    if (j == r - 1)
    printf("\n");
  }
  return 0;
}
```

6. Write a C program to store numbers into an array and find the frequency of a particular number in array and print it.

```
#include <stdio.h>

int main(){

int n,i;
```

```
printf("Enter number of elements: ");

scanf("%d",&n);

int arr[n];

for(i=0;i<n;i++)
    scanf("%d",&arr[i]);

int number, frequency = 0;
printf("Enter a number: ");

scanf("%d",&number);

for(i=0;i<n;i++)
{
    if(number == arr[i]){
        frequency ++;
    }
}

printf("The frequency of %d in array is %d",number,frequency);

return 0;

}
```

7. Write a C program to copy the string str2 into str1 without using strcpy() function.

```
#include <stdio.h>

int main(){
int i;
char str1[100];
char str2[100];
printf("Enter your String: ");
gets(str1);

for(i=0;str1[i]!='\0';i++){
    str2[i] = str1[i];
}
printf("The copied String is: %s",str2);
return 0;

}
```

8. Write a C program to check whether a string is palindrome or not without using string function.

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

int main()
{
    char s[1000];
    int i,n,c=0;

    printf("Enter  the string : ");
    gets(s);
    n=strlen(s);

    for(i=0;i<n/2;i++)
    {
      if(s[i]==s[n-i-1])
      c++;

  }
  if(c==i)
      printf("string is palindrome");
    else
        printf("string is not palindrome");



    return 0;
}
```

9. Write a C program to read your email id and print the number of vowels, consonants and special characters in it.

```
#include <stdio.h>
int main()
{
    char str[100];
    char *p;
    int  vCount=0,cCount=0,specChar=0;

    printf("Enter any string: ");
    fgets(str, 100, stdin);

    //assign base address of char array to pointer
    p=str;

    //'\0' signifies end of the string
    while(*p!='\0')
    {
```

```
        if(*p=='A' ||*p=='E' ||*p=='I' ||*p=='O' ||*p=='U'||*p=='a' ||*p=='e' ||*p=
='i' ||*p=='o' ||*p=='u')
            vCount++;
        if(*p=='@' || *p=='.')
            specChar++;
        else
            cCount++;
        //increase the pointer, to point next character
        p++;
    }

    printf("Number of Vowels in String: %d\n",vCount);
    printf("Number of Consonants in String: %d",cCount);
    printf("Number of Special Charactes in String: %d",specChar);
    return 0;
}
```

10. Write a C program to insert a sub-string in to given main string at a given position without using string functions.

```
#include <stdio.h>
int main(){
char str1[100];
char str2[50];
char str_final[200];
int i,j,k=0,pos;

puts("enter the first string");
gets(str1);
puts("Enter Second String:");
gets(str2);
printf("Enter the position to insert");
scanf("%d",&pos);
// Print both strings ///
printf("First string: %s \n",&str1);
printf("Second string : %s \n",&str2);

// Start first loop //

for(i=0;i<pos;i++){
 str_final[i]=str1[i];
printf("i=%d => %c \n",i,str_final[i]);
}
k=i; // Position from where final string will start
printf("\n first loop is over --\n");

for(j=0;str2[j] !='\0';j++){
    str_final[k]=str2[j];
    printf("k=%d => %c \n",k,str_final[k]);
    k=k+1;
}
printf("\n second loop is over --\n");
```

```
printf("\n %s  \n",str_final); // Final string at the end of second loop

for(i=i;str1[i] != '\0';i++){
 str_final[k]=str1[i];
 printf("k=%d => %c \n",k,str_final[k]);
 k=k+1;
}
printf("\n third is over --\n");

str_final[k]='\0';
printf("\n Final String is here : \n %s  ",str_final);
return 0;
}
```

C Programming QB Module 3 Part C Solutions for CIE-1

@ Nishant

1. Predict the output of the following code.

```
#include <stdio.h>
int main() {
int arr1[]={97, 98, 99, 100, 101, 102, 104, 105};
int i=0;
while(i++ < 5)
printf("\n %c ", arr1[i++]);
return 0;
}
Output: b
        d
        f
```

2. Find the output of the following code.

```
#include <stdio.h>
void main() {
char a[5] = "IARE";
int i =0;
while(a[i])
printf("%s\n", (a + i++));
}
Output: ARE
        RE
        E
```

3. Find the output of the following code.

```
#include <stdio.h>
void main() {
char s1[10] = “abc”;
char s2[20];
s2 = s1;
printf(“%s”, s2);
}
Output: Error -> You cannot directly assign one array to another.
```

4. Find the output of the following code.

```
#include <stdio.h>
#include <string.h>
void main() {
char s[] = “hello”;
 int i = 0, n = strlen(s);
while(n) {
n--;
s[i] = s[n];
i++; }
printf(“%s”, s);
}
Output: olllo
```

5. Find the output of the following code.

```
#include <stdio.h>
void main() {
int a1[10], a2[10];
int i;
for(i=1; i<=9; i++) {
a1[i] = 'A' + i;
a2[i] = 'a' + i;
printf("%d\n", a2[i] -a1[i]); }
}
```