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TCS–201

B. TECH. (COMMON TO ALL) (SECOND SEMESTER) END SEMESTER EXAMINATION, July/Aug. 2022

PROGRAMMING FOR PROBLEM SOLVING

Time :Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each question carries 10 marks.

1. (a) Elaborate on compiler time and run time initialization of 1-D and 2-D arrays with a suitable snippet of C code. Can the size of the array be modified at run time ? Give reason.

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(b) Draw a flowchart and design a C program that reads a string from the standard input device separated by spaces. Call a UDF that returns the reversed string to the calling program. In the calling program check if it's a palindrome or not. Display appropriate message.

(c) Write an algorithm and implement a C program to read the names of employees of a certain organization. Store it in an appropriate data type. Then accept a name to be searched from the user in the accepted list, if present display "Search is successful" otherwise display "Search is unsuccessful".

2. (a) Give the prototype of each of the following functions used during dynamic memory allocation feature available in C and also briefly explain their functionality with their parameters :

(i) malloc

(ii) calloc

(iii) realloc

(iv) free

(b) Illustrate a pointer declaration in C and explain the meaning of dereferencing a pointer. Assume an array NUM[ ] = {–111, 555, – 333, 222, – 444}. Demonstrate how the values of each of the negative numbers can be changed by adding a value of + 50 using a pointer.

(c) Draw a flowchart and design a C program to accept a string from the user than call a function **'Replace'** that replaces all the vowels present in the passed string with capital 'X' and then print the modified string in the calling program. Implement using a pointer.

3. (a) Declare item_code, item_name, quantity, and unit_per_rate as the members of a union and a structure. Compare the memory allocated by the structure and union types using a fragment of C code. Which of these needs mor memory ? Justify.

(b) Open a file "File1.txt" present in the current default path. Read the last

200 bytes from the files and transfer it to another file "Chunk.txt" also present in the current path. Display the content of the chunk.txt to the standard output device.

(c) Explain the following functions available in C :

(i) fopen

(ii) fscanf

(iii) ftell

(iv) feof

4. (a) Predict the output of C and Python code :

(i)

```
#include <stdio.h>
int main ()
{char s [ ] = "STRINGS ARE
STRINGS";
int i = 0;
while (i < 4) {
  printf ("\n%c %c %c", s [i], * (s), i [s]);
   i++;
 }
return 0;
 }
```

(ii)
```
#include <stdio.h>
int main ()
{
   int x [] = {20, 60, 100, 140};
   int *p = x;
   for (int i = 0; i < 4; i ++) {
       *p = *p + 5;
       p = p + 1;
      *p = 100;
       printf("%d", x[i]);
   }
return 0;
}
```

(iii)
```
#include <stdio.h>
int main ()
{
FILE *fp=fopen ("Rhymes.txt", "w+");
char str[15];
fprintf(fp, "Up above the world so high like a diamond in the sky");
rewind(fp);
fseek(fp, 13L, 0);
```

```
fscanf(fp, "%5s", str);
printf("%s", str);
fclose(fp);
return 0;
}
```

(iv) Code in Python

```
words = "Make it happen. Nothing succeeds like success"
print(words[0 : 14])
print(words[-29 : ])
```

(v)

```
dd = {}
1st = ["aaa", "bcbd", "edede", "aaa"}
for w in 1st :
 if w not in dd;
  dd[w] = len (w)
print (dd)
```

(b) List the important features of Python programming language. Write a program in Python to read two positive integers as base and exponent from the user. Find the resultant value by evaluating the base to its exponent. (Ex. $2^3 = 8$, 2 is the base and 3 is the exponent).

(c) Using snippet of Python code demonstrate the use of the following functions :

(i) range

(ii) append

(iii) sort

(iv) del

5. (a) Write a python program to read a sentence from the user and display the same by capitalizing the first letter of each of the words present in it to the console.

(b) "**List are mutable while tuples are immutable.**" Justify the statement with least three similarities and two difference between a list and a tuple with a python code.

(c) Assume a file "**Pytnon.py**" present the current drive. Write a python code to display the size of the file in bytes to the output screen.