Education and Research Department

Assignments for Programming Fundamentals

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Assignment Day 1

1. Write a program to find whether the number entered by the user is a prime number or not. Extend this program to list all the prime numbers between two given numbers.
2. Do the following for the user-entered number of students.
   Find the average marks for a student of his marks in 3 subjects. Print whether he passed or failed. A student will fail if his average is less than 50. Use for loop
3. Do the following for an unknown number of students. (User will explicitly indicate when to terminate). Find the average marks for a student of his marks in 3 subjects. Print whether he passed or failed. A student will fail if his average is less than 50 Use While loop.
4. Write a program, that accepts a integer from the user and print the integer with reverse digits. For eg: rev(1234) = 4321.
5. The librarian in a library wants an application that will calculate the due date for a book given the issue date. The no. of days in which the book is due can be decided by the librarian at the time of issuing a book. For e.g. If the librarian enters the current date as 14-01-99 and the no of days in which the book is due as 15, then your program should calculate the due date and give the output as 29-01-99.
6. Find the sum of the digits of a given number.
7. Given a number, determine its absolute value.
8. Given three numbers, determine whether they can form the sides of a triangle.
9. Given a number, determine whether it is a valid year and if so, whether it is a leap year.
10. Given two numbers, determine whether they are valid years, and if so, list all leap years between the two years (both included).

Assignment Day 2

For the following assignments, write down the prototypes for the functions used before writing the functions.

1. Write a program to find the nearest smaller prime number for a given integer; use a function to decide whether a number is prime or not.
2. Write a program to convert a number in decimal system to binary system. Hint: use recursion.
3. Write a program that takes a positive integer as input and outputs the Fibonacci sequence up to that number.
4. Given a function with the following prototype

   int date_diff (int d1, int m1, int d2, int m2, int yr)

   Where d1 and m1 are the day and month of the first date and d2 & m2 are the day and month for second date and yr is the year to which both the dates belong. The function returns the difference between the two dates that fall in different year. Write a program to find the difference between two dates that do not fall in the same year.
5. Write a program to print whether the number entered is a prime/odd. Use functions
6. Write a program that accepts input of a number of seconds, validates it and outputs the equivalent number of hours, minutes and seconds.
7. Write a program that can either add or multiply two fractions. The two fractions and the operation to be performed are taken as input and the result is displayed as output.
8. Write a recursive function to compute the factorial to a given number. Use the function to write a program which will generate a table of factorials of numbers ranging from 1 to m where m is the number entered by the user.
9. Write a program which to print the multiplication table from 1 to m for n where m, n is the values entered by the user.
10. Develop a calculator program which will use functions to add / subtract / divide / multiply 2 numbers. Code the functions as different source files and link them.

Assignment Day 3

Note: In all the below problems, use and define as many as functions as possible.

1. Write a function, which checks whether one string is a sub-string of another string.
2. Write a program that accepts a sentence and returns the sentence with all the extra spaces trimmed off. (In a sentence, words need to be separated by only one space; if any two words are separated by more than one space, remove extra spaces)
3. Write a program, which checks for duplicate string in an array of strings.
4. Write functions to insert and delete a string from an array of strings. Write a program that displays a menu to the user
   a) Insert String
   b) Delete Strings
   c) Exit

   Depending on the user choice the program will call functions that will insert / delete a string from an array of strings
5. Write a program that will accept a string and character to search. The program will call a function, which will search for the occurrence position of the character in the string and return its position. Function should return –1 if the character is not found in the input string.
6. Write a function, which prints a given number in words.
7. Write an program which will set the array element a[i] to 1 if i is prime, and to 0 if i is not prime. Assume the array size to be 10000.
8. Write a program to count the number of vowels in a given string.
9. Write a program to obtain the transpose of a 4*4 array. The transpose is obtained by exchanging the elements of each row with the elements of the corresponding column
10. Write a program which allow to perform any of the following operations on two 3*3 arrays
    - Add Arrays
    - Multiply Arrays
    - Subtract Arrays

Assignment Day 4

1. Write a function for linear search.
2. Write a function for binary search.
3. Write a function to find whether a string exists in an array of strings. This function should do a partial search for the string.
4. Write a program to sort 3*3 array elements (row wise)
5. Write a program that accepts up to 10 words and outputs them in dictionary order. (Hint: sort an array of numbers that represent the words; don't directly sort the words.) Do NOT use the sort functions provided in the standard library. Here is a typical user session:

   Enter words: Damn Cold Bothers All Animals

   Sorted words: All Animals Bothers Cold Damn

   More? (Y/N) N
6. Write a program to count number of words in a given text file.
7. Write a program to check print the highest scorer.

   Student details are stored in file in the format as below: -

   StudNo 4 chars

   StudName 20 chars

   Marks 2 digits
8. Write a program to update the marks of a given student Accept the student number and new marks from the user. Use the same student file of Q7.
9. Write a program to print student details from the student file
10. Write a program to print records randomly. Accept a record number from the user and print the record. Use the same student file of Q7.