CSE 115: Programming Language I
Spring 2016,
Final Exam
Marks: 90
Time: 90 Minutes
Date: 9th April, 2016

[Please answer question 1 and any 5 more questions]

1. (a) [Structure]Write down a structure ***emp*** that is capable of storing the following information about an employee in an organization: [5+5+5]
   - 4-digit employee number
   - Age
   - Salary

   (b) Use the ***emp*** structure to take input of N employees' information. N will also be input to your program.

   (c) Write down a function that will take an array of ***emp*** structure and the number of employees as parameters and returns the highest salary amount paid to an employee.

2. (a) What will be output of following C code? [3+4+8]

```
#include<stdio.h>
int main(){
   int x=011,i;
   for(i=0;i<x;i+=3){
      printf("Start ");
      continue;
      printf("End");
   }
   return 0;
}
```

(b) Consider the following code.

```
int j, sum = 0;
for (j = 0; j < 10; j++)
  sum += j;
```

Rewrite the C statements so that they compute the same quantity but use a while loop instead of a for loop.

(c) The value of the mathematical constant e can be expressed using the infinite series:

$$e = 1 + 1/1! + 1/2! + 1/3! + \ldots$$

Write a complete C program that approximates e by approximating the value of

$$1 + 1/1! + 1/2! + 1/3! + \ldots$$

Rather than adding an infinite number of terms, your program should continue adding terms until the value of a term is less than 0.001. Your program should print the approximation to e and the number of terms used to determine the approximation. The *terms* in the series are 1, 1/1!, 1/2!, and so on.

3. (a)[2D Array] Write a program that takes a 6*6 matrix A from user and then calculates and print the sum of the diagonal elements in A. For e.g. for the following input matrix, the program will print 26. (diagonal elements are marked as red). [10]

$$A = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 7 & 8 & 9 & 0 & 1 & 2 \\ 3 & 4 & 5 & 6 & 7 & 8 \\ 9 & 0 & 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 3 & 4 & 5 \\ 8 & 9 & 0 & 8 & 7 & 6 \end{pmatrix}$$

   (b) [File] Write the code to print that diagonal to a file.[5]

4. (a) [String] Assume that s1,s2,and s3 are declared as follows: [2]

```
Char s1[10]="he",s2[20]="she",s3[30],s4[40];
```