

CMPS 150
Final Exam – Sample with 2-D Array

Assume you have a 2-dimensional array of floating point numbers, with 15 rows and 12 columns, and all 180 elements already contain a valid value. Each row (rows 0–14) represents a different hospital, and each column represents a month of the year (with column 0 = January). There are values stored in each cell representing that hospital's number of emergency room admissions for that month.

Write a code FRAGMENT for each of the following:

a) Calculate the total (overall) emergency admissions, i.e., you must sum all 180 array elements.

```
sumAll = 0;

for(i=0;i<15;i++)
    for(j=0;j<12;j++)
        sumAll = sumAll + array[i][j];

cout << setw(32) << "Total Emergency Admissions: " << sumAll << endl;
```

b) Calculate/determine which hospital (0-14) had the least number of admissions for the entire year.

```
// initialize all sums (15 hospitals) to zero
for(i=0;i<15;i++)
    sumHospital[i] = 0;

// sum the total admissions for all 15 hospitals
for(i=0;i<15;i++)
    for(j=0;j<12;j++)
        sumHospital[i] = sumHospital[i] + array[i][j];

// determine which hospital has the minimum (fewest) total admissions
minOverall = 100000;
for(i=0;i<15;i++)
{
    if (sumHospital[i] < minOverall)
    {
        minOverall = sumHospital[i];
        minOverallIndex = i;
    }
}

cout << setw(32) << "Least Admissions: " << minOverall << endl;

cout << setw(32) << "Hospital with Least Admissions: " << minOverallIndex << endl;
```

c) Calculate and print total admissions for each month.

NOTE: You may use the constant below to make printing month names easier.

HINT: Be careful on this one. For example, all admissions for January are in slots: [0][0],[1][0],.....[14][0]

```
const string MONTH[12] = {"January", "February", "March", "April", "May", "June", "July",  
                          "August", "September", "October", "November", "December"};
```

```
// calculate the sum of admissions for each month (each sum is a column sum)  
for(j=0;j<12;j++)  
{  
    sumEachMonth[j] = 0;  
  
    for(i=0;i<15;i++)  
        sumEachMonth[j] = sumEachMonth[j] + array[i][j];  
}
```

```
// print out the sum of admissions for each month  
for(j=0;j<12;j++)  
{  
    cout << "Admissions for " << setw(11) << MONTH[j] << ": "  
          << sumEachMonth[j] << endl;  
}
```