Benha University
Faculty of Engineering (at Shoubra)
Surveying Engineering Department
2nd Year

Midterm Exam
Subject: Computer Applications I - SUR 224
Date: Thu 26/03/2015
Duration: 1 hour

Attempt **three** of the following questions including the **first**.

№ of Questions: 4 in 1 page(s)
Total Mark: 10

Question 1: **(2** Marks**)**

Determine the output for each of the following code snippets (assuming successful compilation):

a) **(1** Mark**)**

```
for (int i = 0; i < 5; i++) {
    cout << 2 * i << "\n";
}
cout << endl;
```

b) **(1** Mark**)**

```
for (int i = 0; i > 5; i++) {
    cout << i << endl;
}
cout << "i";
```

Question 2: **(4** Marks**)**

Write a complete program that reads three angles a_1, a_2, a_3, performs *Traverse Angle Balancing*, and prints the corrected angles $\hat{a}_1, \hat{a}_2, \hat{a}_3$.

$$e = (a_1 + a_2 + a_3) - 180$$
$$c = \frac{e}{3}$$
$$\hat{a}_1 = a_1 - c, \hat{a}_2 = a_2 - c, \hat{a}_3 = a_3 - c$$

Example:

If the measured angles are $a = \{61.5, 60.5, 59.5\}$, then the corrected angles should be $\hat{a} = \{61.0, 60.0, 59.0\}$.

Question 3: **(4** Marks**)**

Write a complete program that reads a list of `n` numbers and prints its range. The range is the difference between the maximum and minimum values of the list.

Example:

If the numbers are $\{4, 6, 8, 10\}$, then the range is $10 - 4 = 6$.

Question 4: **(4** Marks**)**

Write a program that reads a nonnegative integer and computes and prints its factorial. The factorial of a nonnegative integer n is written $n!$ (pronounced "n factorial") and is defined as follows:

$$n! = \begin{cases} n \cdot (n-1) \cdot (n-2) \cdot \ldots \cdot 1 & , n \geqslant 1 \\ 1 & , n = 0 \end{cases}$$

Example:

$5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$, which is 120.

Good Luck
Dr. Islam ElShaarawy