EXAMINATION INSTRUCTIONS

* Do not turn this page until asked to do so.
* Exam time is 50 minutes.
* Put the answers on the same question sheet, do not use any additional papers, even for scratch.
* Write your name, ID, section no. in the indicated places.
* Read the exam instructions.
* Read the honesty policy.
* Sign the following statement.

Academic Integrity Policy

Cheating in Exams is a violation of the Academic Integrity policy of AUC. Whispering, talking, looking at someone else’s paper, or copying from any source is considered cheating. Any one who does any of these actions or her/his answers indicates that she/he did any of them, will receive a punishment ranging from zero in this exam to failing the course. If repeated, it may lead to dismissal from AUC.

I have read the honesty policy and exam instructions and I am presenting this exam as entirely my effort.

Signature: ______________

DO NOT USE THIS SECTION

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Question 3 (15 points)
An integer number is divisible by 9 if the sum of its digits is divisible by 9. For example, 2205 is divisible by 9 because the sum of its digits is \(2+2+0+5 = 9\) which is divisible by 9 and 549 is divisible by 9 because the sum of its digits is \(5+4+9 = 18\) which is divisible by 9.

The following C++ modular program takes a positive integer number greater than 1 and less than 1000 and prompts the user whether the entered number is divisible by 9 or not, using the above mentioned technique. There are some missings (represented by dots) in the given program. Complete these missings such that the program could be compiled and run correctly. The program does not accept any integer number outside the given range (greater than 1 and less than 2000).

**The Program**

```cpp
#include <iostream>
#include <string>
using namespace std;

bool checkDivisible(int n) {
    int sum = 0;
    const int ten = 10;
    while (n > 0) {
        sum += n % ten;
        n = n / ten;
    }
    return (sum % 9 == 0);
}

void main () {
    int num;
    do {
        cout << “Enter an integer number between 1 and 1000:” << endl;
        cin >> num;
    } while (checkDivisible(num) == false);
    if (checkDivisible(num))
        cout << “The number" << setw(10) << num << "is divisible by 9" << endl;
    else
        cout << “The number" << setw(10) << num << "is NOT divisible by 9" << endl;
}
```
Question 2 (15 points)
Show the output of each of the following program segments:

```cpp
int F[6] = {1, 1};
const int zero = 0;
const int one = 1;
for (int k = 2; k < 6; k++)
{
    F[k] = F[k-1] + F[k-2];
    cout << setw(3) << k << setw(3) << F[k] << endl;
}
``` 

```cpp
int myfunc(int n);
void main ()
{
    int s = 0;
    for (int k=0; k < 6; k += 3)
        s += myfunc(k);
    cout << "my result is" << setw(4) << s << endl;
}
``` 

```cpp
const int n = 6;
int L[n] = {5, 5, 5, 8, 9, 9};
bool valu = true;
int k = 0;
while ( (k<n-1) && (valu) )
{
    if (L[k] > L[k+1])
    {
        valu = false;
        cout << setw(2) << k << setw(2) << L[k] << endl;
    }
    else
        k++;
}
if (valu)
    cout << " The list is OK" << endl;
```
**Question 3 (20 points)**

The volume of a cone and area of its base, given the radius its base and its height, are computed as follows:

**Area of base = \( \pi \times \text{Radius}^2 \)**

**Volume of cone = \( \frac{1}{3} \pi \times \text{Radius}^2 \times \text{Height} \)**

Write a modular C++ program that takes values for the radius and height (the program should not take any value of these greater than 100), compute the area of the base and the volume of the cone, and print out these values **rounded to the nearest tenth** in proper output format. Define a function `computeAV` that takes the radius and height, computes the area and the volume and returning them back to the `main` function of the program. The program should repeat taking values for radius and height, computing and printing out the results until the user enters **0 (zero)** for the radius.

### The Program

```cpp

```

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