Problem description:

pi (π) can be approximated as:

π/ 4 ≈ 1 – 1/3 + 1/5 – 1/7 + …

Reference: http://en.wikipedia.org/wiki/Taylor_series

Write an assembly program to use the floating point unit to compute pi. Let the user input the number of terms used for computing pi. For example, the number of terms is 4 in the above formula. You may assume that the number of terms is not larger than 100,000.

Steps:

1. show the student name and student ID.
2. ask the user to input n which is the number of terms.
3. if n == 0, exit the program.
4. If n > 100, 000, set it to 100, 000.
5. estimate pi using n terms.
6. show the estimated pi value.
8. go back to sep 2.

You should not output something that is unnecessary. **DO NOT CHEAT in programming. You should learn on your own.**

We will rebuild your program to mark it.

Late submission penalty: each day 30%.

• **Please hand-in the following items:**

1. Source code. Upload the source code to the E3 platform. Your source code must be well aligned and documented. You should use the template. At the top of the main.asm file, you must fill out your name, ID and email.

2. A hardcopy report. **Print out the report and submit it in class.**

IMPORTANCE: The files should be put in a single folder and then compressed before uploading to the FTP site. The name of the folder must be asm01_ID_Name.

For example, if your ID is 123456789 and your name is XYZ, then the folder name must be asm01_123456789_XYZ.

Hints: A C/C++ program:

Hints: A C++ program for computing pi:

```
const int max = 100000;
double v[max]; // intermediate values for pi
int num = 100; // number of terms
double pi = 0; // current approximated value for pi
double d = 1.0; // the absolute reciprocal for a term
int sg = 1; // sign control
for (int i = 0; i < num; i++) {
    pi += sg/(double)d;
    v[i] = pi; // store the value obtained at i-th step.
    d += 2;
    sg *= -1; //flip sign
}
pi *=4;
cout << "PI = " << pi << endl;
```

Note: Please refer to the text book to learn FPU.

The following functions may be used:

finit fadd fdiv fmul fstp fchs

ReadInt (defined in Irvine32.inc)

WriteString (defined in Irvine32.inc)

mWrite (defined in macros.inc)

Report format:

==========

Student Name:_____ Assignment:_____

Student ID:_____

Student Email:_____

Claim: I worked on my own. (YES / NO) Must tick one.

If this is not your own work, your score is zero.

DO NOT CHEAT in programming. You should learn on your own.

Introduction (at least 150 words) [15%]

Word Count:_____ (must filled, or zero point)

Program description (at least 200 words) [20%]

Word Count:_____ (must filled, or zero point)

Methodology (at least 300 words) [30%]

Word Count:_____ (must filled, or zero point)

Experiments (at least 200 words) [20%]

Word Count:_____ (must filled, or zero point)

Show a table which contains:

- show the computed values with different number of terms
- show the actual value of pi
- draw a graph for different number of terms and the corresponding estimated pi

Write down your own observations.

Conclusion (at least 150 words) [15%]

Word Count:_____ (must filled, or zero point)

What you have learnt?