

AMAT 2120 — Fall 2005
Assignment 2 — Due Wednesday Oct.12, 2005

1 Write a C program to calculate the sum of all members of the arithmetic progression that contains 999 numbers beginning with -31. The difference of the progression is 7. Your program must obtain the result by direct summation. Then check the computed result using a general formula for the sum of an arithmetic progression.

This time an electronic submission (along with printout) is required. You have to submit electronically only the program, not the script.

2 The code below calculates a^6 in two ways: using the usual algorithm ($a^6 = a \times a \times \dots$ six times) and using a faster method. Then the two results are compared. Assuming that there is preprocessor directive `#define _INIT_A 3` on top of the program, trace execution. Find the ultimate values of all variables. Why do I say that the method B is faster?

```
int a; /* a is the number we raise to the power 6*/
int i; /*loop counter */
int prod_A; /* accumulator for product in the usual method (method A)*/
int p2,p4, prod_B; /*intermediate products and final result in the faster method */
int diff; /* difference between the results obtained by methods A and B

1  a=_INIT_A;

/* Method A: usual method */
2  prod_A=a;
3  for (i=1; i<=5; i++)
4    prod_A=prod_A*a;

/* Method B: faster method */
5  p2=a*a;
6  p4=p2*p2;
7  prod_B=p4*p2;

/* Comparing: */
8  diff=prod_A-prod_B;
```

(Only executable lines of code are numbered here.)

3 Evaluate the following expressions and determine the type (`int` or `double`) of the result. In evaluating the expressions be aware of data types of all intermediate calculations.

- a) $(5.0 - 8/3) + 1.333333$
- b) $4 + 16\%5 - 7 * 2$
- c) $0\&\&1$
- d) $(0||1) + 1$
- e) $(1 == 2) + 1$
- f) $(1\%2) * 1000 + (1/2)$