```
////////////////////////////////////////////////////////////////////////
//      var.c program to test memory allocation in C
//         M. Mizuno (c) 1995, 2004, 2005
//          modified for Learning Tree course 223P
//
// to compile var.c on Pentium,
// 1. execute Visual Studio .NET 2003 Command Prompt
// 2. go to the directory which contains var.c
// 3. issue cl /Od /FAcs var.c
//        /Od: disable optimization
//        /FAcs: generate a listing file with source code and machine code
////////////////////////////////////////////////////////////////////////
long test(unsigned int ui, int i, short s, unsigned short us,
        char c, unsigned char uc, long l, unsigned long ul,
        int x, short y);

char ret;
int x=100;
static int si;
static int sj = 23;

int main(int argc, char **argv, char **envp)
{
        unsigned char uc;
        static short y = 99;
        short s;
        char c;
        unsigned short us;
        static int i;
        unsigned int ui;
        long l;
        unsigned long ul;

        if (i < 0) {
                ui = us + s - c;
        }
        else {
                ul = si - sj * 2;
        }

        while (sj > 0) {
                uc = y - 3;
                sj++;
        }

        ret = test(ui, i, s, us, c, uc, l, ul, x,  y);

        return 0;
}

long test(unsigned int ui, int i, short s, unsigned short us,
        char c, unsigned char uc, long l, unsigned long ul,
        int x, short y)
{
        char c1;
        int i1;
        char c2;

        ui = 1;
        i = 2;
        s = 3;
        us = 4;
        c = 5;
        uc = 6;
        l = 7;
        ul = 8;
        x = 9;
        y = 10;
        c1 = 11;
        c2 = 12;
        i1 = 13;
        return ui * 2 + l;
}
```


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; Listing generated by Microsoft (R) Optimizing Compiler Version 18.00.21005.1

        TITLE   c:\LearningTree\223P\Programs\memory_test\Pentium\optimize\var.c
        .686P
        .XMM
        include listing.inc
        .model  flat

INCLUDELIB LIBCMT
INCLUDELIB OLDNAMES

PUBLIC  _x
_DATA   SEGMENT
COMM    _ret:BYTE
_DATA   ENDS
_DATA   SEGMENT
_x      DD      064H
_sj     DD      017H
?y@?1??main@@9@9 DW 063H                                ; 'main'::'2'::y
_DATA   ENDS
PUBLIC  _main
PUBLIC  _test
; Function compile flags: /Ogtpy
; File c:\learningtree\223p\programs\memory_test\pentium\optimize\var.c
_TEXT   SEGMENT
_ui$ = 8                                                ; size = 4
_i$ = 12                                                ; size = 4
_s$ = 16                                                ; size = 2
_us$ = 20                                               ; size = 2
_c$ = 24                                                ; size = 1
_uc$ = 28                                               ; size = 1
_l$ = 32                                                ; size = 4
_ul$ = 36                                               ; size = 4
_x$ = 40                                                ; size = 4
_y$ = 44                                                ; size = 2
_test   PROC

; 55   :        char c1;
; 56   :        int i1;
; 57   :        char c2;
; 58   :
; 59   :        ui = 1;
; 60   :        i = 2;
; 61   :        s = 3;
; 62   :        us = 4;
; 63   :        c = 5;
; 64   :        uc = 6;
; 65   :        l = 7;
; 66   :        ul = 8;
; 67   :        x = 9;
; 68   :        y = 10;
; 69   :        c1 = 11;
; 70   :        c2 = 12;
; 71   :        i1 = 13;
; 72   :        return ui * 2 + l;

  00000 b8 09 00 00 00   mov     eax, 9

; 73   : }

  00005 c3               ret     0
_test   ENDP
_TEXT   ENDS
; Function compile flags: /Ogtpy
; File c:\learningtree\223p\programs\memory_test\pentium\optimize\var.c
_TEXT   SEGMENT
_argc$ = 8                                              ; size = 4
_argv$ = 12                                             ; size = 4
_envp$ = 16                                             ; size = 4
_main   PROC

; 24   :        unsigned char uc;
; 25   :        static short y = 99;
```



```
; 26   :        short s;
; 27   :        char c;
; 28   :        unsigned short us;
; 29   :        static int i;
; 30   :        unsigned int ui;
; 31   :        long l;
; 32   :        unsigned long ul;
; 33   :
; 34   :        if (i < 0) {
; 35   :                ui = us + s - c;
; 36   :        }
; 37   :        else {
; 38   :                ul = si - sj * 2;
; 39   :        }
; 40   :
; 41   :        while (sj > 0) {

  00000 a1 00 00 00 00   mov     eax, DWORD PTR _sj
  00005 85 c0            test    eax, eax
  00007 7e 11            jle     SHORT $LN13@main
  00009 8d a4 24 00 00
        00 00            npad    7
$LL2@main:

; 42   :                uc = y - 3;
; 43   :                sj++;

  00010 40               inc     eax
  00011 85 c0            test    eax, eax
  00013 7f fb            jg      SHORT $LL2@main
  00015 a3 00 00 00 00   mov     DWORD PTR _sj, eax
$LN13@main:

; 44   :        }
; 45   :
; 46   :        ret = test(ui, i, s, us, c, uc, l, ul, x,  y);
; 47   :
; 48   :        return 0;

  0001a 33 c0            xor     eax, eax
  0001c c6 05 00 00 00
        00 09            mov     BYTE PTR _ret, 9

; 49   : }

  00023 c3               ret     0
_main   ENDP
_TEXT   ENDS
END
```