1995 Paper 12 Question 6

Programming in C and C++

Students have been set a programming exercise where they are expected to write a subroutine to perform a certain operation, and they have been told that they should write it in the language C. One of the offerings submitted for assessment is the following. The student involved, who had read a book by Dijkstra but not understood it, proudly proclaims that of course this program has not actually been tried on a computer.

Explain what the program is (probably) supposed to do, and identify as many problems with it as you can, given that in this examination questions are expected to be completed in around 30 minutes.

```
typedef unsigned long int thing;

#define swap(p,q) v = p; p = q; q = v;

void fast(thing a[], int left, int write)
{                       /*********************
    int i, j;           * Declare variobles! *
    thing v;            *********************/
    if (write-left > 1)
    {   v = a[write];
        i = left, j = write;
        for (;;)
        {   while (a[++i] < v};
            while (a[--j] >= v);
            if (i < j) swap(a[i], a[j]);
            else break;
        }
        fast(a, left, i-1);  // re-curse here.
        fast(a, i, write)
    }
}
```

[20 marks]

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