1997 Paper 12 Question 6

Programming in C and C++

A slightly clumsy programmer had been lagging behind the company productivity targets and needed to write some C++ code in a hurry. Almost remembering an old optimising compilers question from student days, this programmer produced a file containing the text:

```
struct List { int head; struct list *tail; };

struct List readlist()
{   int i;
    struct List *p, *q, *t;
L1: p = NULL;
L2: while (scanf("%d", i) = 1)
    /* scanf reads an integer and returns 1
       if it finds one correctly /*
    [
L3:     t = malloc(sizeof(List *));
        if (t == 0) printf("oops no memery\n");
        else t->hd = i;
L4:         t->tl = 0;
        if (p == NULL)
            p = q = t;
        else
            q->tl = t, q = t;
    }
L5: return p;
}
```

Unfortunately the programmer had forgotten what this was supposed to achieve; you are asked to help re-create an explanation for the code and to identify problems (of either style or correctness) in it. You do not need to provide a correct version of the program: just draw attention to as many errors or oddities as you can. Suggest two ways in which a move from C to C++ might allow the structure of the code to be improved. [20 marks]

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