EEN424 Mid-term exam, 23rd October 2012.

1.

Write your name and student number very clearly indeed.

2.

What exactly would this function do when called? (no need to write all the newlines).

```
void one()
{ int i;
  printf("A\n");
  for (i=1; i<=3; i+=1)
  { printf("B%d\n", i);
    fork();
    printf("C%d\n", i); }
  printf("D\n"); }
```

Briefly explain your reasoning.

3.

Write a function in BCPL that sorts a vector of positive integers, putting them in *descending* order.

4.

Write in standard C declarations for:

a. an array of 25 strings,
b. a pointer to an array of 25 strings,
c. an array of 25 pointers to arrays of ints,
d. a function that takes an array of ints as its parameter, and returns a pointer to an array of floats as its result,
e. a function that takes two parameters:
   a function that takes an array of ints as its parameter and returns a double,
   and an array of ints,
   and returns a pointer to an array of doubles as its result,
f. a variable that can store a pointer to a double-to-double function such as sin, cos, or exp.

5.

Write a standard C function that sorts an array of strings so that they appear in ascending order alphabetically, but:

- Do not use any string library functions: if you need something, you must define it.
- Do not change the original array, create a new one to contain the sorted strings. The function should return this new array as its result.

6.

Write a standard C function that finds the position of the first 1 in an int (using its internal binary representation). The least significant bit is at position 0. Do not make any assumptions about the size of an int.

examples:

firstone(7) = 0, because 7 in binary is 00000000000000000111
firstone(80) = 4, because 80 in binary is 00000000000001010000
firstone(0) = −1, because it has no ones in it, −1 is the way to signal that.

Your function is probably linear in time (meaning that the time it takes would be proportional to the size of an int in bits). For extra credit, write a logarithmic version.

7.

Sign the honour pledge

8.

Check your answers. If you decide to leave, don't disturb anyone with clumsy fumbling noises.