

EEN322
Soft Friendly Test
(but puppies are still forbidden)
4th December 2014

Name:

Student number:

Sign here if you did not give or receive aid in any form during this test,
and did not consult any written or printed material apart from this test:

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Don't write in these boxes.

Question	Out of	Grade
5	50	
6	50	
7	1	

5. Read Ahead!

A.

Write a C function that counts, and returns as its result, the number of 1 bits in its `int` parameter. Make the minimum number of assumptions.

B.

Ten million three-bit numbers (range 0 to 7) are to be stored in the smallest amount of space possible. Here you may assume that an `int` occupies 32 bits, so ten of these small numbers will fit nicely inside a single `int`, and all you need is an array of one million `ints`. We will not worry about the two wasted bits in each `int`.

Write two functions that operate on this array.

`get` returns the value of the i^{th} three bit value (i is a parameter)

`set` changes the i^{th} three bit value to V (i and V are parameters)

C.

Adapt your answer so that instead of storing 10,000,000 little numbers, it now stores N little numbers, and instead of the little numbers having three bits each, they now have B bits each. N and B are unknown until the special function `create_array(int N, int B)` is called. You will need a `struct` for your special array representation.

6.

- A. Give the sequence of function calls required to set up and run an internet server. Say what each of the individual functions does.
- B. Give the sequence of function calls required to set up and run a compatible internet client. Say what each of the individual functions does. You do not need to say the same thing twice.
- C. The server will run a simple factorial calculating service. Once a client connects, it will send a series of numbers in decimal as text, separated by '\n' characters. As soon as the server receives a number, it will calculate its factorial and transmit it back to the client in the same format. Do not worry about overflow. The client will send the number 0 to indicate that it wishes to terminate the session.

Write the code for the portion of the server that handles a single session with a client. Your code should start right after the connection has been accepted, and finish when the connection has been closed.

7.

Draw a picture of a puppy being forbidden.

