//Q1

```c
#include <stdbool.h>

#include <stdint.h>

#include <stdio.h>

int main() {

    // Declare pointers that will allow you to access the GPIO registers:

    uint32_t* gpio_config = (uint32_t*)0x40001000; // Output control reg

    volatile uint32_t* gpio_value = (uint32_t*)0x40001004; // Level register


    // Set GPIO Pin 0 to output mode, and set the value of Pin 0 to high

    *gpio_config |= (1 << 0); // Configure Pin 0 as output

    *gpio_value |= (1 << 0);  // Set Pin 0 to high


    // Read the value of Pin 1, and print it

    bool pin1 = (*gpio_value & (1 << 1)) != 0;

    printf("Pin 1 is %s\n", pin1 ? "high" : "low");

    return 0;

}
```

//Q2 Helper Function

```c
// Return whether the specified pin is currently configured as an output or not

bool is_output(uint32_t pin) {

    // gpio_config is the register at 0x40001000 controlling pin configuration

    volatile uint32_t* gpio_config = (uint32_t*)0x40001000;
```

```
    // Check if the bit corresponding to 'pin' is set to 1 (configured as output)

    return ((*gpio_config & (1 << pin)) != 0);

}


// Set the level of (only) the specified pin

void set_level(uint32_t pin, bool level) {

    // gpio_value is the register at 0x40001004 controlling pin levels

    volatile uint32_t* gpio_value = (uint32_t*)0x40001004;


    if (level) {

        // Set the bit corresponding to 'pin' to 1 without affecting other bits

        *gpio_value |= (1 << pin);

    } else {

        // Clear the bit corresponding to 'pin' to 0 without affecting other bits

        *gpio_value &= ~(1 << pin);

    }

}
```

Q3 :

buffer begins at: 0x20004000

eth begins at: 0x20004008

ipv4 begins at: 0x20004016

udp begins at: 0x2000402A   //(previous address + 20 bytes size of ipv4 packet)

payload begins at: 0x20004032 //(previous address + 8 bytes size of ipv4 packet)

Q4 :

The class is unique in terms of giving us report or Homework 2 which is like exploring the real world, business needs dictating how technology would be implemented. Its seems very close to real world, the technology and topics seems everyday use tech!