CS 254 Digital Logic Design
ATM Controller: Module 2 (Final Submission)

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main.c:

`struct arg_lit *assignOpt= arg_lit0("y", "custom", "        assignment'');`
This was added to add the `-y` option to the help menu. We also added this variable to the argTable which is printed in the help menu.
The rest of the changes are explained using inline comments below.
```

```
```
if(assignOpt->count > 0) {
        printf("Executing CommFPGA actions on FPGALink device %s...\n", vp);
        if ( isCommCapable ) { // Checking if the device supports CommFPGA
                uint8 isRunning;
                fStatus = flSelectConduit(handle, conduit, &error);
                CHECK_STATUS(fStatus, FLP_LIBERR, cleanup);
                fStatus = flIsFPGARunning(handle, &isRunning, &error);
                CHECK_STATUS(fStatus, FLP_LIBERR, cleanup);

                // Checking if FPGALink device is running and ready to talk.
                if ( isRunning ) {

                // This is the important part. We loop through all 128 registers.
                        for(int i =0;i<128;i++){

                // The variable `buffer` will store the input read from the register
                                uint8 buffer[1];

                /* Reading 1 byte(= 8 bits) from channel number `i` and storing it in the buffer.(Note each channel stores 8 bits) */
                                flReadChannel(handle,(uint8) i, 1, buffer, &error);

                                printf("%i\n", buffer[0]);

                /* Adding `i` to the value read from the buffer(According to the required specifications) */
                                buffer[0] += i;

                /* Writing the value in buffer(1 byte) to the next register.
(Note that value read from register 127 will be written into register 0 after proper calculations.) */

        flWriteChannel(handle,(uint8) (i+1)%128, 1, buffer, &error);
        flSleep(1000); //waiting for 1 second before next iteration
}

                } else {

                // Error message
```

```
                    fprintf(stderr, "The FPGALink device at %s is not ready to talk - did you forget
--program?\n", vp);
                    FAIL(FLP_ARGS, cleanup);
                }
        } else {

                // Error message
                fprintf(stderr, "Action requested but device at %s does not support CommFPGA\n", vp);
                FAIL(FLP_ARGS, cleanup);
        }
```

cksum_rtl.vhdl:

- We needed an array of 128 std logic vectors of size 8, so we defined a type MyArray for the same.
- Used it as data type for reg, reg_next.
- We could have initialised in the first 500 cycles of waiting but it does initialise with a zero default value so that was not required.
- The waittime integer signal is for the initial wait time of 500 cycles.
- In the main process, until waitime = 500, nothing happens.
- If a reset signal is sent the corresponding register is reset (Unimportant)
- Otherwise the 'i'th (channel address = i) register is updated and checksum signal is also updated (Unimportant)
- After the process, it is the code for reading or writing data.
- Only if the 'h2fValid_in' signal is '1', 'i'th reg_next value (i = chanAddr_in) is updated to the value from h2fData_in, else value remains same.
- f2hData_out is set to value from the corresponding 'i'th register as is the value of the chanAddr_in variable.
- The values of f2hValid_out is always '1' so need not be checked.
- The display of led_out is also set to the 'i'th register value, this is the value that is displayed on the leds
- Assignment of the checksum variable is kept the same as it is immaterial what it is assigned but it is kept in the code as it port mapped to data_in (unimportant) in the code.

Honor Code:

Shaan Vaidya
"The entire work submitted by the above group members have been done by them, and no part has been copied, or copied-and-modified-to-obfuscate, except the code fragments given by the instructors. All work that has been referenced has been properly cited, and no cited work has been copied, or copied-and-modified-to-obfuscate."

Kanak Agrawal
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