

ECE 3340 Numerical Methods

Homework 2: Prerequisite Programming

Name:

ID:

Solve the following problems from **Chapter 2, Prerequisites: Programming**. Use any available space to work out the problem and place your final solution in the box provided.

Problem 1: Provide the contents of the registers corresponding to w , x , y , and z

```
...
unsigned char a = 200;
unsigned char b = 2;
unsigned int c = 128;
unsigned int w = c % 7
unsigned int x = a + c;
unsigned int y = (unsigned char)(a + c);
unsigned int z = a * b;
...
```

$$w = \boxed{ } \quad x = \boxed{ } \quad y = \boxed{ } \quad z = \boxed{ }$$

Problem 2: Allocate space for the parameters of the BLAS sgemm function

The *Basic Linear Algebra Subroutines* (BLAS) library is a popular set of functions for implementing tensor operations. The “gemm” function is a BLAS subroutine that performs a “general matrix-matrix multiply”. Specifically, it evaluates the expression:

$$\mathbf{C} = \alpha \mathbf{A} \mathbf{B} + \beta \mathbf{C} \quad \text{where} \quad \mathbf{A} \in \mathbb{R}^{m \times k} \quad \text{and} \quad \mathbf{B} \in \mathbb{R}^{k \times n}$$

The data type for a BLAS function is specified by the first letter. For example, “dgemm” takes arrays representing 64-bit real values and “sgemm” takes arrays representing 32-bit real values. The C signature for the sgemm function looks like this:

```
void sgemm(int m, int n, int k, float alpha, float* A, float* B, float beta, float* C)
```

Write the code to allocate arrays for \mathbf{A} , \mathbf{B} , and \mathbf{C} assuming all of the other values are specified.