CS 31 Homework 3

Due Friday Oct. 7ᵗʰ, or Monday Oct.17ᵗʰ

Please print this document single-sided to give yourself more space to write.

1. Translate the following `IA32` assembly snippet into `C` code. Start by translating to `C` code with `goto`, then rewrite it to eliminate the `goto` statements.

```
    movl    $101, -4(%ebp)
    movl    $-22, -8(%ebp)
    movl    -4(%ebp), %eax
    addl    %eax, %eax
    addl    -8(%ebp), %eax
    movl    %eax, -12(%ebp)
    cmpl    $0, -12(%ebp)
    je      .L2
    movl    -8(%ebp), %eax
    imull   -12(%ebp), %eax
    movl    %eax, -4(%ebp)
    jmp     .L5
.L2:
    movl    -8(%ebp), %eax
    subl    %eax, -4(%ebp)
.L5:
    # end
```

The `C` program has variables `x`, `y`, and `z`, stored at the following memory locations:

```
x: M[%ebp] - 12
y: M[%ebp] - 8
z: M[%ebp] - 4
```

2. Translate the following `C` code snippet to `IA32` assembly. Start by rewriting the `C` code to replace the while loop with `goto` statements.

```
int hamster, bunny, gerbil;
hamster = 17;
bunny = 99;
gerbil = hamster - bunny;
while(hamster < bunny){
    hamster *= 3;
    if(gerbil < 128){
        gerbil += hamster;
    }
}
```

You may assume the variables are stored at the following memory locations:

hamster: M[%ebp] - 12
bunny: M[%ebp] - 8
gerbil: M[%ebp] - 4