

Homework 1

Due September 21 (Wednesday)

1. Translate the following C++ statements into a) MIPS assembly language, and into b) machine code. C++ variables are all integers (*int*) and are kept in registers (*x* in \$s0, *y* in \$s1, *z* in \$s2, and *i* in \$s4). *A* is an integer array and its base address is in \$s5. Use registers \$t0 through \$t9 as temporaries.

1. $x = (x + y) - (z * 4);$
2. $x = y;$
3. $x = y + A[8];$
4. $A[i] = x + y + z;$
5. $A[i] = A[i - 1];$

2. Translate the following C++ programs into a) MIPS assembly language, and b) machine code.

Function:

```
int max ( int g, int h, int i)
{
    int f;
    int f1, f2;
    f1=g+h;
    f2=i+A[8];
    if ( f1> f2)
        f=f1;
    else
        f=f2;
    return f;
}
```

Call:

```
x=max(y,2,3);
```

x,y is in register \$s0, \$s1

A is a global interger array, starting address is in \$s3

f1, f2,f use register \$t0, \$t1, \$s0

3. Explain the functionality of the following two C++ program, and translate into MIPS assembly language. (Bonus : 1 Point)

function 1:

```
int bitcount(int x) {
    int c=0;
    for (int i=0;i<=sizeof(x)*8;i++) {
        c=c+(x&1);
        x=x>>1;
    }
    return c;
}
```

function 2:

```
int bitcount(int x) {
    int c=0;
    while (x!=0) {
        c++;
        x=x&(x-1);
    }
    return c;
}
```