

CS3021/3421 Tutorial 1

Consider the following C/C++ code segment.

```
int g = 256;

int p(int i, int j)
{
    int k;
    k = i + j;
    return (k << 2) - 1;
}

int q(int i)
{
    return p(g, -i);
}

int f(int n)
{
    if (n > 0) {
        return n*f(n-1);
    } else {
        return 1;
    }
}
```

- Q1. Translate the code segments above into IA32 assembly language using the basic code generation strategy outlined in lectures.
- Q2. What does the function $f(n)$ calculate? Draw the state of the stack frames after a call to $f(10)$ has been made during the calculation of $f(13)$.
- Q3. Using Visual Studio (or equivalent), create a Win32 application with files `t1.h` and `t1.asm` containing the IA32 assembly language for $p(\dots)$, $q(\dots)$ and $f(\dots)$. Write C++ code to test $p(\dots)$, $q(\dots)$ and $f(\dots)$ by, for example, calling $f(\dots)$ to calculate $f(1)$, $f(2)$ to $f(10)$ [see [IA32codegen.cpp](#)]. Hand in listings of your code files and a screen dump of the console window showing the results of your program.