



CS1021 Tutorial #4

Flow Control and Pseudo-Code Translation

Translating Pseudo-code into ARM Assembly Language

Translate each of the following pseudo-code programs into ARM Assembly Language, making use of the CMP instruction and the conditional branch instructions shown on the **Flow Control Cheat Sheet**.

- (a) Assume x is a signed value stored in R0.

```
if (x > 1)
{
    x = x + 5;
}
```

- (b) Assume x is stored in R0.

```
if (x == 0)
{
    x = 1;
}
else
{
    x = x * 2;
}
```

- (c) Assume x is a signed value stored in R0 and y is stored in R1.

```
while (x < 0)
{
    y = y * x;
    x = x + 1;
}
```

- (d) Assume x is an unsigned value stored in R0 and y is stored in R1.

```
while (x > 5)
{
    y = y + (2 * x);
    x = x - 5;
}
```



- (e) Assume *i* is an unsigned value stored in R0 and *y* is stored in R1.

```
for (i = 0; i < 10; i = i + 1)
{
    y = y + (i * i);
}
```

- (f) Assume *a*, *b* and *c* are unsigned values stored in R4, R5 and R6 respectively.

```
while (a + b < 100)
{
    a = a + 1;
    b = b + c;
}
```

- (g) Assume *s* is an unsigned value stored in R3, *t* is an unsigned value stored in R4 and *r* is an unsigned value stored in R5.

```
t = 0;
while (t < 5)
{
    s = 0;
    while (s < 10)
    {
        r = (t * 10) + s;
        s = s + 1;
    }
    t = t + 1;
}
```

- (h) Assume *ch* is an ASCII character code stored in R1 and *v* is stored in R0.

```
if (ch >= '0' && ch <= '9')
{
    v = ch - '0';
}
else if (ch >= 'A' && ch <= 'F')
{
    v = ch - 'A' + 0xA;
}
else
{
    v = 0xFFFFFFFF;
}
```

(What does this pseudo-code do?)