

ARM ISA Exercises

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Assembly

```
a = b + c;
```

```
a = b - c;
```

```
a = b + c - d;
```

```
a = b + c;
```

```
a = b + c - d;
```

Arithmetic

```
int a = 0x4f3C
```

```
int a = 0x6d5e4f3c
```

Conditional Statement

```
if (i == j) f = g + h;  
f = f - 1;
```

```
if (i == j) f = g + h;  
else f = f - 1;
```

```
switch (amount) {  
    case 20: fee = 2; break;  
    case 50: fee = 3; break  
    case100: fee = 5; break;  
    default: fee = 0;  
}
```

Loop (1)

```
int pow = 1;
int x = 0;
while (pow != 128) {
    pow = pow * 2;
    x = x + 1;
}

int sum = 0;
for (i=0; i != 10; i=i+1) {
    sum = sum + i;
}
```

Loop (2)

```
int sum = 0;
int i = 0;
while (i != 10) {
    sum = sum + i;
    i = i + 1;
}
```

```
int sum = 0;
for (i=1; i<101; i=i*2) {
    sum = sum + i;
}
```

Arrays

```
int array[5];  
array[0] = array[0] * 8;  
array[1] = array[1] * 8;  
  
int i;  
int array[1000];  
for (i=0; i<1000; i=i+1) {  
    array[i] = array[i] * 8;  
}
```


Procedure Calls (1)

```
int main() {  
    simple();  
    ...  
}
```

```
void simple() {  
    return;  
}
```

Procedure Calls (2)

```
int main() {  
    int y;  
    ...  
    y = diffofsums(2, 3, 4, 5);  
    ...  
}
```

```
int diffofsums(int f, int g, int h, int i) {  
    int result;  
    result = (f+g) - (h+i);  
    return result;  
}
```

Recursive Calls

```
int factorial (int n) {  
    if (n <= 1)  
        return 1;  
    else  
        return (n * factorial(n-1));  
}
```

Object Code and Executable

```
int f, g, y;

int main (void) {
    f = 2;
    g = 3;
    y = sum(f, g);
    return y;
}
```

Reference

- [1] D. Harris, "Digital Design and Computer Architecture", 2nd ed.
- [2] D.A. Patterson & J.H. Hennessy, "Computer Organization and Design (ARM ed)"