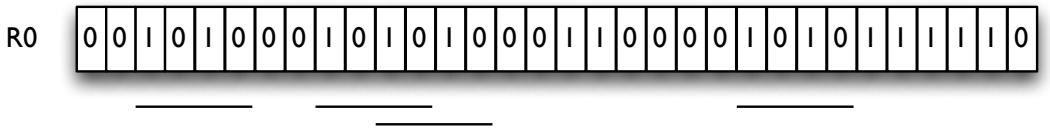
CS1021 Tutorial #10
Sample Exam Questions

Working in small groups, pick one of the following sample exam questions to work on.

(a) Translate the pseudo-code shown below into ARM Assembly Language. Assume that a, b, c, i and r are stored in R0, R1, R2, R3 and R4 respectively.

```
c = 1;
r = 1;
for (i = 1; i < 32; i++) {
  b = a & 1;
  a = a >> 1;
  if (b == (a & 1)) {
    c = c + 1;
  } else {
    if (c > r) {
      r = c;
    }
    c = 1;
  }
}
if (c > r) {
  r = c;
}
```

(b) Design and write an ARM Assembly Language program that will count the number of occurrences of the bit pattern **1010** in the 32-bit word in R0. **The occurrences may overlap.** For example, the 32-bit word below contains four occurrences of 1010, which have been underlined. Your program should store its result in R1.



Your answer must include:

(i) an explanation of your approach and
(ii) your ARM Assembly Language program.

(c) Design and write an ARM Assembly Language program that will determine the most frequently occurring letter in a NULL-terminated ASCII string. Your program should be **case insensitive**. If there is a tie for the most frequently occurring letter, the letter closest to the start of the alphabet wins.

Your program should store the ASCII code for the most frequently occurring letter in R0 and the number of times that it occurs in R1. Assume that R2 contains the start address of the string and that R3 contains the address of a region of memory that you may use for your own purposes.

Your answer must include:

(i) an explanation of your approach and

(ii) your ARM Assembly Language program.

(d) Design and write an ARM Assembly Language program that will convert a NULL-terminated string to "CamelCase". For the purpose of this exercise, a CamelCase string is a string that contains only alphabetic characters, no spaces and each word begins with a capital letter. "IntroductionToComputing" is an example of a CamelCase string.

Assume that R1 contains the start address of the original string. Store the new CamelCase string in memory beginning at the address contained in R0. You may also assume that the original string contains only alphabetic characters and spaces.

Your answer must include:

(i) an explanation of your approach and

(ii) your ARM Assembly Language program.