PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENIGNEERING

Midterm Examination: Semester II   Academic Year: 2011
Date: 22 December 2011   Time: 13:30 – 16:30
Subject: 241- 532 Hardware Software Codesign   Room: หัวหุ่นยนต์

Instructions:
      1. Allow all documents or text books.
      2. Answer all 7 questions. (35 marks in totals).


1. Explain typical codesign process.   (2 marks)

2. Map the following C program to ARM Assembly code   (3 marks)

Listing 1.1 C example

```
1
2  int max;
3
4  int findmax(int a[10]) {
5    unsigned i;
6    max = a[0];
7    for (i=1; i<10; i++)
8      if (a[i] > max) max = a[i];
9  }
```

3. Make SDF Graph to compute Fibonacci Number series F which is defined by
$F(0)=0$, $F(1)=1$, $F(i)=F(i-1)+F(i-2)$ when i is greater than 1.   (5 marks)

4. For the SDF graph of the below figure, find a condition between x and y for a
PASS to exist.   (5 marks)
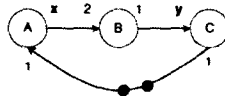
5. Create CFG (control flow graph) corresponding to this C program   (5 marks)

```
1: int gcd(int a, int b) {
2:   while(a != b) {
3:     if(a > b)
4:       a = a - b;
     else
5:       b = b - a;
   }
6:   return a;
}
```

6. What is the difference between thread C programming and ImpulseC?   (5 marks)

7. Design the system (using ImpulseC) using distributed arithmetic (DA) structure to
compute this following equation: $y = \sum_{n=0}^{N-1} c[n]x[n]$.   (10 marks)