

**Problem 1.** Run the stable marriage algorithm on the following instance to create a stable marriage. Show **all** your steps.

**Instance:** There are 4 men,  $m_1, m_2, m_3, m_4$  and 4 women,  $w_1, w_2, w_3, w_4$ . Following are the preference lists for the 4 men:

- $m_1 : [w_1, w_2, w_4, w_3]$
- $m_2 : [w_1, w_4, w_2, w_3]$
- $m_3 : [w_1, w_2, w_3, w_4]$
- $m_4 : [w_4, w_3, w_1, w_2]$

Preference list for the women are as follow:

- $w_1 : [m_2, m_3, m_1, m_4]$
- $w_2 : [m_3, m_1, m_2, m_4]$
- $w_3 : [m_4, m_2, m_1, m_3]$
- $w_4 : [m_2, m_4, m_1, m_3]$

**Problem 2.**  $x = 1$  ;  $y = 2$   
`def f(a, b)`  
`return (a - b)`  
`end`  
`print ('#{f(x,y)} and #{f(y,x)}\n')`

What will this program output?

**Problem 3.** Run Euclid's Greatest Common Divisor algorithm on the pair of numbers (85, 119). Show all the steps and then determine the final answer.

**Problem 4.** Consider the graph in Figure 1.

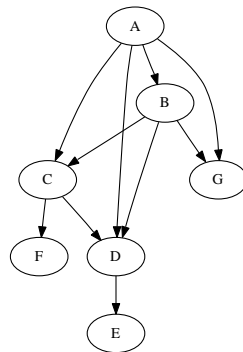


Figure 1: A graph with 7 nodes and 10 edges

- Which node has the highest in-degree?
- Who are A's neighbors?
- Which node has the lowest out-degree?

**Problem 5.** Consider the following program:

```
A = Array.new
A[0] = 1
A[1] = 1

5.times{|i|
  A[i+2] = A[i]+A[i+1]
}
```

What is the content of A at the end of this execution?

**Problem 6.**

```
def arraySum(a)
  # a is an array containing integers
  # function returns sum of all elements in a

  sum = 0

  #... fill in this part ...

  return sum
end
```

Function `arraySum` takes an array as input. Fill in the function body such that the return value of `arraySum` is the sum of all the elements in the input array. Here is a sample execution of `arraySum`:

```
A = [1, 2, 3]
arraySum(A) => 6
```