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. \( x = 1 \); \( y = 2 \)

```python
def f(a, b):
    return (a - b)
end
print ('''#{f(x,y)} and #{f(y,x)}
''')
```

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.

![Graph](image)

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|
}

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
```