

# ECE1762 HW5

Homework Group #9

Group member 1 | email | student number

Group member 2 | email | student number

Total Pages: ??

Thursday 19<sup>th</sup> September, 2024

## 1 Question 1 Examples of proof

a.

**Theorem.** *Some theorem here.*

*Proof.* Proof by induction

**Base Step:** When  $n = 1$ , is true.

**Induction Hypothesis:** Suppose is true

**Induction Step:** Consider when

□

b. Time complexity:  $\mathcal{O}(n)$

*Proof.* ( $\Leftarrow$ ) Assume by Contradiction,

( $\Rightarrow$ )

□

## 2 Question 2 Example Pseudocode

```
1: function GALE-SHAPLEY( $E, S$ )
2:   initialize all employers in  $E$  and students in  $S$  to unmatched
3:   while an unmatched employer with at least one student on its preference list remains do
4:     choose such an employer  $e \in E$ 
5:     make offer to next student  $s \in S$  on  $e$ 's preference list
6:     if  $s$  is unmatched then
7:       Match  $e$  with  $s$                                      ▷  $s$  accepts  $e$ 's offer
8:     else if  $s$  prefers  $e$  to their current employer  $e'$  then
9:       Unmatch  $s$  and  $e'$                                      ▷  $s$  rejects  $e'$ 
10:      Match  $e$  with  $s$                                        ▷  $s$  accepts  $e$ 's offer
11:     end if
12:     cross  $s$  off  $e$ 's preference list
13:   end while
14:   report the set of matched pairs as the final matching
15: end function
```

### 3 Question 3

This figure shows xxx

Figure 1: Example image