# COMP2711 Revision

## 1 Logic

1. Prove/Disprove quantifier statement(Giving Counter example)
2. Laws of logic

## 2 Counting and Probability

1. Inclusion and Exclusion
2. Combinatorial Proof
3. Dearrangement, start with example $\Longrightarrow$ Generalize

## 3 Number Theory

1. Modular Equations
2. Chinese Remained theorem

## 4 RSA

1. Set up RSA
2. Extended GCD
3. Repeated string(?)

## 5 Mathematical induction

1. Not math equation
2. real world problem

## 6 Algorithm

1. Finding $O$, $\Theta$, $\Omega$
2. Worse case analysis
3. Find $O$ first, then find example for $\Omega$

# 7 Recurrence

1. Iterate the recurrence(closed form solution)
2. Use M.I. to prove the recursion

# 8 Graph

1. Euler graph/circuit: Circuit in a graph $G$ is a simple circuit containing every edge $G$. An Euler path in $G$ is a simple path containing every edge of $G$.
2. Complete Graph: exactly one edge between every pair of vertices in $V$. $n \geq 1$
3. Cycle: 1 to 2, 2 to 3 ... and $n$ to 1. $n \geq 3$
4. Bipartite Graph: can be partitioned into two disjoint subsets $V_1$ and $V_2$ such that $(V_1 \cap V_2 = \emptyset) \wedge (V_1 \cup V_2 = V)$. $n \geq 2$
5. Complete Bipartite Graph: There are exactly one edge connecting $u_i$ and $v_j$. There are no edges between two vertices in $V$ and $U$. $n \geq 1, m \geq 1$
6. Represent the graph using matrix and list: List: (Vertex/Adjacent Vertices) or (Initial Vertex/Terminal Vertices)
7. Isomorphic: If they can become the same graph