Graph Theory and Combinatorics MATH-42021/52021.
Home Work 7, due on Tuesday, July 13
Instructor: Prof. Artem Zvavitch
8 problems, 2pts each, YES 6 points extra!

Problem 1. *How many different sequences of numbers* $1, 2, 3, 4, 5, 6$ *are possible if a dice is tossed* m *times?*

Problem 2. *How many ways there to pick a man and a woman who are not husband and wife from a group of* n *married couples?*

Problem 3. *How many different six digit numbers can be formed by various arrangements of the six digits* $1, 1, 1, 2, 2, 0$ *(note: a number can not start with zero)?*

Problem 4. *How many* n*-digit binary sequences are there without any pair of consecutive digits being the same?*

Problem 5. *How many different numbers can be formed by the product of two or more of the numbers* $3, 4, 4, 5, 5, 6, 7, 7, 7$*.*

Problem 6. *How many ways are there for a man to invite some (nonempty) subset of his* 12 *fiends for a dinner?*

Problem 7. *How many different* 9*-digit numbers have at least one repeated digit (note: a number can not start with zero)?*

Problem 8. *Prove that for all natural values of* n*:*

$$\sum_{k=0}^{n} \binom{n}{k} = 2^n.$$