ACOL 202 : Discrete Mathematical Structures

Lecture 1 (14^{th} Jan)

Course policy
- → Tutorial submissions
- → Quizzes (best 2/3)
- → Exams
- → Attendance ($\geq 75\%$) (in lectures as well as tutorials)

Course webpage

(check at least once daily)

Claim : For every non-negative integer n, $\underline{(n^2+n+41)}$ is prime.

False. Consider $n = 41$.

$$41^2 + 41 + 41$$

$$= 41(41+1+1)$$

$$= 41 \times 43 \rightarrow \text{not a prime}$$

You may also try to write this as a perfect square.

$$n^2+n+40+1 = n^2 + (n+40) + 1^2$$

If $n = 40$, this becomes $(40+1)^2$.

Claim $\sqrt{2}$ is irrational.

By Contradiction

Suppose $\sqrt{2}$ is rational.

$\sqrt{2} = p/q$ (in its simplest form / lowest terms)

$2 = p^2/q^2$

$2q^2 = p^2$ $\quad \therefore$ p is even

$\therefore$ p^2 is divisible by 4.

$\therefore$ $q^2 = \frac{p^2}{2}$ $\leftarrow$ is divisible by 2

$\therefore$ q is even

contradiction!

$$S = 1 + 2 + 3 + 4 + \dots + n$$

$$S = n + (n-1) + (n-2) + (n-3) + \dots + 1$$

$$2S = (n+1) + (n+1) + (n+1) \dots + (n+1) \quad \frac{n(n+1)}{2}$$

$$S = \frac{n(n+1)}{2}$$ } can be proved by induction.

Next lecture: Basic Data Types (on 17th Jan)

(No tutorials in the Jan 14-17 week)