

Islamic University of Gaza
ECOM2311: Discrete Math.
Fall term 2009-2010
Midterm exam



Computer Engineering Dept.
Mohammed Alhanjouri, Ph.D.
November 25, 2014
11:00 to 12:30

Student Name:.....

Student No.:.....

Solve the seven questions

Q1) Prove that $\sqrt{3}$ is irrational

Q2) By Quantifiers, Establish the validity of the following argument: everyone who is forty is fat or funny. No-one is funny and no-one is fat. So no-one is forty.

Q3) A 50 students were contacted and responded to a school survey. A 3 students liked C prog, C++ prog and java prog, 5 students liked C prog and java prog, 15 students liked C++ prog and java prog , 6 students liked C++ prog and C prog, 30 students liked C++ prog, 8 students liked C prog, 31 students liked java prog. Find: **(1)** How many students like only C prog?
(2) How many students like either C++ prog or java prog, but not C prog?
(3) How many students don't like any of these subjects?

Q4) Write Pseudo-code for the *join* of Zero-One Matrices A, B. And find the complexity?

Q5) Find the smallest big-O of the following equations:

a) $25n \log n + 300 + (3n + 1)(2n + 5)$

b) $x^3 + 2x^2 - 4x + 3^x$

c) $3n^2 \log n + 5n + 48000$

d) $n^2 + n + \log n!$

Q6) a) By using manipulations of summation find:

1)
$$\sum_{k=0}^{10} 3^{k+3}$$

2)
$$\sum_{k=0}^8 k^3$$

b) If $A = \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 0 \\ 1 & 2 \end{bmatrix}$, Find a matrix C such that $[A][C] = [B]$

Q7) Let $f, g : \mathbb{R} \rightarrow \mathbb{R}$ be defined by $f(x) = 4x - 1$ and $g(x) = x^2 + 1$. Find: $(g \circ f)(2)$, $(f \circ g)(3)$