

The rules of the exam are as follows:

- When asked for a runtime in big-O notation, give the tightest and simplest possible bound you can. If your algorithm is  $O(n)$  and also  $O(n^2)$ , just say it is  $O(n)$ . If it is  $O(2n)$ , it is also  $O(n)$ , so omit the factor of 2. And so on.
- Please be sure to write your name at the top of the page. You may wish to do so on the top of each page just in case.
- You should read all the problems as soon as possible; problems are not necessarily in order of difficulty.
- Please solve ALL the problems. Keep your answers clear and concise.
- Please clearly mark all the answers to all your questions **and make sure that they are where they are expected to be**, and keep answers separated from scratch work. Scratch work will not be graded.
- Please write legibly. If we cannot read it, we cannot grade it.
- Absolutely no devices. If you need to use the bathroom during the exam, please leave it with the instructor.

Good luck! Have fun! You got this!!!

Points: 1) 30 points, 2) 30 points, 3) 40 points.

Front row	2nd row	3rd row	Back row
Philip Hoang	Liam Ben-Zvi	Eline Leske	Adham Khafaga
Radiya Rafat	Lily Beaudion	Emalie Zhitomirsky	Ameelya Yeung
Rhea Halebeed	Linh Lai	Eric Kim	Amira Zuniga
Rishven K Pravin	Marcus Hau	Frank Seely	Anastasiia Kon
Ryan Flynn	Melaku Mohammed	James Fourie	Angelo Amato
Shawn Lau	Menahil Bakhat	Jay Patel	Azalea Rohr
Neveah Zhan	Mia O'Halloran	Jiahao Liu	Brian Capozza
Tai Ahmad	Nick David	Jonathan Tsang	Brian Ding
Adrienne Tsai	Nikki Salkar	Joseph Allen	Callum Neher
Vincent Sun	Nora Amer	Joshua Kim	Chanel Thorpe
Walker Turley	Olivia Dodds	Joshua Lee	Christian Abrams
Eric Wang	Om Italiya	Joshua Nahm	Cindy Frempong
Yulian Gogov	Onat Ergin	Kaushik Reddy	Darren Leong
Zahra Nensey	Owen Dinsmore	Kayson Shaikh	Deniz Ozcakir
	Parin Shaik	Kevin Villeda De Leon	Donghwan Kwon