Due Friday, February 26 by 2pm.

1. (Higham Exercise 8.3) Confirm that

\[ C(S, t) = SN(d_1) - Ee^{-r(T-t)}N(d_2) \]

satisfies:

(a) \( C(S, t) = \max\{S(T) - E, 0\} \) (Hint: Take the limit \( t \to T^- \))
(b) \( C(0, t) = 0, \quad 0 \leq t \leq T \) (Hint: Take the limit \( S \to 0^+ \))
(c) \( C(S, t) \approx S, \quad S \gg 1 \) (Hint: Take the limit \( S \to \infty \))

2. (Higham Exercise 8.8) Write down a PDE and final/boundary conditions for the value of a butterfly spread. A butterfly spread is constructed by buying two European calls with exercise prices \( E_1 \) and \( E_3 \) \( (E_1 < E_3) \) and writing two European calls both with exercise price \( E_2 = (E_1 + E_3)/2 \) (all on the same asset with the same expiry date).

3. (Higham Programming Exercise 8.1) Use ch08.m to produce graphs illustrating the limits

\[ \lim_{t \to T^-} C(S, t) = \max\{S(T) - E, 0\} \]

and

\[ \lim_{S \to \infty} C(S, t) = S \]

as established in Exercise 8.3.

Currently, the code can be downloaded from:

http://fox.maths.strath.ac.uk/~aas96106/option_book.html

4. Wilmott, Howison, & Dewynne, Chapter 2, # 1.
5. Wilmott, Howison, & Dewynne, Chapter 3, # 2.
6. Wilmott, Howison, & Dewynne, Chapter 3, # 3.
7. Wilmott, Howison, & Dewynne, Chapter 4, # 1.
8. Wilmott, Howison, & Dewynne, Chapter 5, # 1.
9. Wilmott, Howison, & Dewynne, Chapter 5, # 2.
10. Wilmott, Howison, & Dewynne, Chapter 5, # 3.
11. (0 points) Regarding the Final Project for the class:

(a) Give a one–paragraph description of a possible topic.
(b) Suggest the name of a partner if you have one in mind.