PASS
PEER ASSISTED STUDY SESSIONS

FACIL: Neil Douglas

EMAIL: neildouglas@cmail.carleton.ca

COURSE: ECOR 2606

WEEK: 3

OFFICE: CSAS, 4th Floor MacOdrum Library

OFFICE HOURS: Fridays 3:00 pm to 4:00 pm

Opener: (10 mins)

- Quick review of last week's material: Kahoot quiz!
- Core concepts to be covered in this workshop:
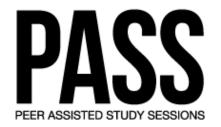   - Writing function files
    - Bisection search

Activity 1: Writing function files (30 mins)

(a) Write a function file (heightballpit.m) that given the length of the ball pit (in m), width of the ball pit (in m), number of balls in the pit, and radius of each ball (in m) determines the minimum height of the ball pit needed to completely fit all of the balls. The ball pit is in the shape of a rectangular prism and each ball in the ball pit has the same radius.

There are a few conditions:

- Due to inevitable spaces between the balls, 1/5 of the volume of the ball pit will not be taken up by the balls. Assume that all balls within the ball pit are packed together as tightly as possible, which allows them to take up 4/5 of the space in the ball pit.
- The radius of the balls must be less than or equal to 1/50 of the length of the ball pit and less than or equal to 1/50 of the width of the ball pit.
- The height of the ball pit must be at least 8 times the diameter of the balls and no more than 50 times the diameter of the balls.

$$Volume\ of\ a\ sphere = \frac{4}{3}\pi r^3$$

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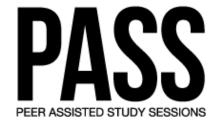
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```matlab
function [height_pit]=heightballpit(l,w,n,r)




end
```

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Activity 2: Bisection search (35 mins)

(i) How does bisection search locate the root of a function? Use a graph to help explain.

(ii) What are the equations for X_R and E_{Max}?

(iii) Use bisection search get an estimation of the root of $f(x) = 3x^2 + 5x - 6$ that falls between x=-1.5 and x=2. Round all answers to four decimal places. What is our best estimation of the root after three iterations of bisection search? What is the maximum error on this root?

$f(-1.5) = $ _____ $f(2) = $ _____

Step	X_L	X_U	X_R	f(X_R)	E_{Max}
1	-1.5000	2.0000			
2					
3					

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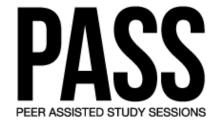**OFFICE HOURS:** Fridays 3:00 pm to 4:00 pm

Rough work:

Root: _____   Maximum Error: _____

(iv) What is the maximum error on the root after 9 iterations?

Closer: (5 mins)

- Snowball feedback!

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