

Course's Name : Artificial  
intelligence  
Course's Number : 12140532  
Questions' Number : 1  
Total Mark : 10  
Time: 02/04/2024-09/04/2024

Palestine Technical University - Kadoorie



Assignment #1  
Semester two 2023-2024

Instructor's Name: Dr. Mohammed  
Khalil.

Student's Name: \_\_\_\_\_

Student's Number: \_\_\_\_\_

Section's Number: \_\_\_\_\_

Question	Points	Outcomes	Question Grade	Required time minutes
Q1			10	
Student Grade				

#### تعليمات مهمة:

1. يجب ارسال الكود كنص حتى تستطيع تجربته والتأكد منه.
2. يجب ان يعمل الكود مهما كان توزيع الاحرف الستة. (مع العلم انه تم اختيار توزيعه الاحرف التالية لأغراض التقييم)
3. يجب ان ترفق ملف يشرح عمل كل الدوال بطريقتك الخاص وباللغة التي تريد بالإضافة الى صور تنفيذ البرنامج لأكثر من حل.
4. احرص عزيزي الطالب على تسليم حلولك الخاصة وعدم مشاركة اجاباتك مع اي طالب اخر.
5. التزم بكل التعليمات السابقة، لأنها ستكون ضمن معايير التقييم.

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## Question #1:

(10 Points)

### Knight's Tour

The updated Knight's Tour challenge involves starting with an 8x8 board where each square is either empty or contains one of six unique letters based on your first and last name. In each move, a letter can be moved to an adjacent empty square (excluding diagonals). The objective is to use A\* and Breadth-First Search algorithms to rearrange the letters on the board in such a way that a knight can visit all the squares containing letters.

Here is an example: Student Name: **Omar Khalil**

initial state:

	O						
		M		K			
	A						
				H			
							L

**Note:** Define the initial state in the main method as shown in the example above.

**Your program must output:**

1. Your first name, your last name, and the first six unique letters derived from them.
2. For A\* and for Breadth-First Search, the solution must be printed as follows:
  - 1) The goal state achieved using each search algorithm.
  - 2) Sequence of steps, each on a separate line as shown in the example below.
  - 3) The number of states expanded using each search algorithm.

For example:

Student Name: **Omar Khalil**

First six unique letters are: **O M A R K H L**

**Algorithm:** A star.

**One of the goal states:**

	O						
				K			
		M					
	A			H			
							L

**Solution:**  
move M down  
move A down  
move H Left

**Number of expanded states:.**  
22

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Algorithm: *Breadth FirstSearch*

One of the goal states:

	O						
				K			
		M					
A							
			H				
						L	

Solution:

move O up  
move A up  
move K up  
move H left  
move Left  
move A left  
move H up  
move L up  
move L left

Number of expanded states:

82

The End