

## 1 Part 1 – Questions

1.1 Does the bug always move to a new location? Explain.

No. If the bug was surrounded by rocks, it won't move to another location.

1.2 In which direction does the bug move?

The bug attempts to move forward.

1.3 What does the bug do if it does not move?

The bug will turn right 45° and try to move.

1.4 What does a bug leave behind when it moves?

The bug leaves a flower in old location when it moves.

1.5 What happens when the bug is at an edge of the grid? (Consider whether the bug is facing the edge as well as whether the bug is facing some other direction when answering this question.)

When the bug is at an edge of the grid and we use “Act()”, it will turn right 45°. When we use “Act()”, it will turn right 45° again.

However, when we use “Move()”, it will be removed from grid and leave a flower on the location.

1.6 What happens when a bug has a rock in the location immediately in front of it?

It will turn right 45°.

1.7 Does a flower move?

No. Flowers can't move.

1.8 What behavior does a flower have?

A flower will change its color to dark slowly.

1.9 Does a rock move or have any other behavior?

No.

1.10 Can more than one actor (bug, flower, rock) be in the same location in the grid at the same time?

No. In the same location, a new actor must replace the old actor.

## 2 Part1 – Exercises

2.1 Test the setDirection method with the following inputs and complete the table, giving the compass direction each input represents.

Degrees	Compass Direction
0	North
45	Northeast
90	East
135	Southeast
180	South
225	Southwest
270	West
315	Northwest
360	North

2.2 Move a bug to a different location using the moveTo method. In which directions can you move it? How far can you move it? What happens if you try to move the bug outside the grid?

We can move it to any valid location in the grid.

When we use the moveTo method, the bug will always hold it's original direction. That is, the bug won't change it's direction when we use this method.

If I try to move the bug out side the grid such as location(111, 111), the bug won't change it's location and the program will throw an IllegalArgumentException.

2.3 Change the color of a bug, a flower, and a rock. Which method did you use?

I will use the setColor method

2.4 Move a rock on top of a bug and then move the rock again. What happened to the bug?

When I use the moveTo method to move a rock on top of the bug, that location is covered by the rock, and I can't find any bug on grid. However, when I move the rock to another location, the original location is empty, and there is still zero bug on the grid. That is, the bug is removed from the grid.