
PROGRAMMING IN ALICE

WORKSHOP: INDEFINITE LOOPS

LEARNING OBJECTIVES

The learning objectives for this workshop are:

- Students can design and implement programs using indefinite loops
- Students can use the random number function in their programs
- Students can design and use class level methods

EXERCISE 1

In this activity you will design and develop a cat and mouse game. The cat chases the mouse at the same time the mouse moves in a random direction trying to evade the cat. When the cat finally catches the mouse it will enjoy a tasty meal. To assist in the development of the program we provide a number of suggested development steps.

STEP 1: CREATING THE WORLD

Create a new world that includes a Cat object (Animals) and a Mouse object (Animals). Ensure that the mouse is initially a reasonable distance away from the cat and that it is facing away from the cat. You may wish to add some additional scenery to make the chase a little more interesting.



STEP 2: CREATING CHASE METHOD

Create a new *class method* for the Cat class called **chase**. In this method the cat should turn to face the mouse, then move forward 1 metre. You may wish to add some animation to the cat's movement, but you should do this *after* you have completed the other steps.

STEP 3: CREATING RUN AWAY METHOD

Create a new class method for the Cat class called **runAway**. In this method the mouse should turn left or right a random amount (up to a maximum of $\frac{1}{4}$ of a revolution in either direction). You will need to use the **random number** function to determine the amount to turn. The mouse should then move forward 1 metre.

STEP 4: INTRODUCING A LOOP

In **my first method** create a while loop. In the body of the while loop you must call the methods **chase** and **runAway**. You will need to design a test for the while loop, such that the loop continues until the cat is within a certain distance of the mouse (use an appropriate function to determine the distance between the cat and mouse).

STEP 5: CATCHING THE MOUSE

Create a new class method for the Cat class called **eatMouse**. The method should perform an appropriate action once the cat catches the mouse. Call the **eatMouse** method in **my first method** after the while loop.

EXTENSION: AN ALTERNATIVE ENDING

Create a new class method for the Mouse class called **eatCat**. In this method the mouse gets revenge and eats the cat instead. In my first method use the **choose true probabilityOfTrue of time**(from World object) to call **eatMouse** 60% of the time and call **eatCat** the remaining 40% of the time. HINT: you will need to use an if statement.