Session Guide: The Human Robot

Session Outline

Description

This session works best in a room with square tiles large enough for a person to stand on, with an open space of at least 10x10 tiles. If such a place is not available, a room or a field can be set up with any kind of markers (stones, boxes, bottlecaps, or anything locally available) outlining a grid, using markers as vertices of each point. Initially three basic instructions can be given, step forward, turn right or turn left. One learner will act as a robot and the groups will have to give hir or her instructions on how to get from one square in the grid to another square. The activity will then be extended by adding obstacles and further instructions. Learners will be able to create new instructions to get the robot to do a variety of things such as a dance.

The objective of this session is to implicitly introduce ideas related to coding and programming by defining a set of instructions that need to be listed and carried out in order to fulfil a particular objective. The concept of strict unbreakable rules and following instructions regardless of what they are, key ideas in programming, will be highlighted throughout.

Session Objectives

The objectives of this session are to:

- To understand the importance of rigour and clarity in instructions.
- To be able to follow step-by-step instructions without deviating.
- To develop spatial awareness.
- To expand their problem solving and problem posing skills.

Expected Outcomes

By the end of the session learners will have:
- Written sequences of instructions to solve problems.
- Created complexities in problems.
- Posed new problems to one another.
- Created a robot dance routine to be performed by following clearly defined instructions.

Areas involved

- Mathematics and Financial literacy
  - Math Brain Teasers
  - Geometry shapes
- Life skills
  - Communication
- Creative Arts
  - Music and dance

Activity: Introducing the Human Robot Game

Objectives

To be aware of the importance of clearly defined rules and instructions.

Expected Outcomes

Learners will have attempted to generate a list of instructions for an individual to act as a robot and get from point A to point B.

Teaching Instructions

Set out the grid as presented in the description. Find a volunteer to become the robot and place him or her in a square in the grid facing a particular direction. It is important to explain that whether they want it or not they will have to follow the instructions given by their peers. Present the initial three instructions to the group: turn right (while staying in the same square in the grid), turn left (while staying in the same square in the grid) or move forwards to the square in front of them. Select a different square somewhere else in the grid. The learners (except the robot) get in groups of 3 or 4 and list a sequence of instructions for the robot to follow to get from where they are to the selected square. Each group then takes it in turn to read out the instructions for the robot to follow and test whether it gets to the right place or not. After each go, the robot goes back to the initial square facing the same direction as before.

Suggested Guidelines

- Even if a group realises that they made a mistake they should read out their full set of instructions anyway and test where the robot would end up.

- Groups should not be allowed to change their sequence of instructions after seeing another group's instructions, once they are written down they should remain fixed.

Student Instructions

Imagine you have a grid with a very simple robot on it. You can give the robot three instructions: Turn Right (staying in the same square), Turn Left (staying in the same square) or Move Forwards (to the square directly in front of it). The picture below shows an arrow representing the robot and the direction it's facing. Write a sequence of instructions so that the robot gets from where it is to the highlighted square. Once you wrote your instructions, make the robot follow them, without changing anything in your sequence, to test if it gets to the right place.
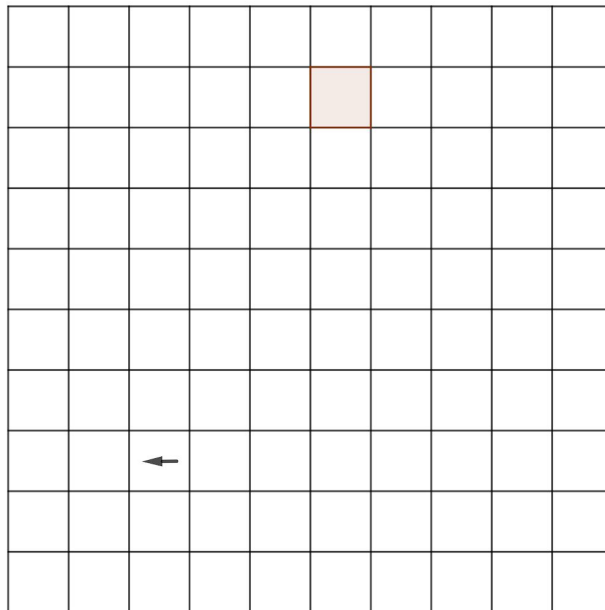
Activity: Adding Complexities

Objectives

To build on their understanding of the abstract sequences instructions by adding complexities. To develop learners' spatial awareness.

Expected Outcomes

Learners will have created more complicated sequences of instructions
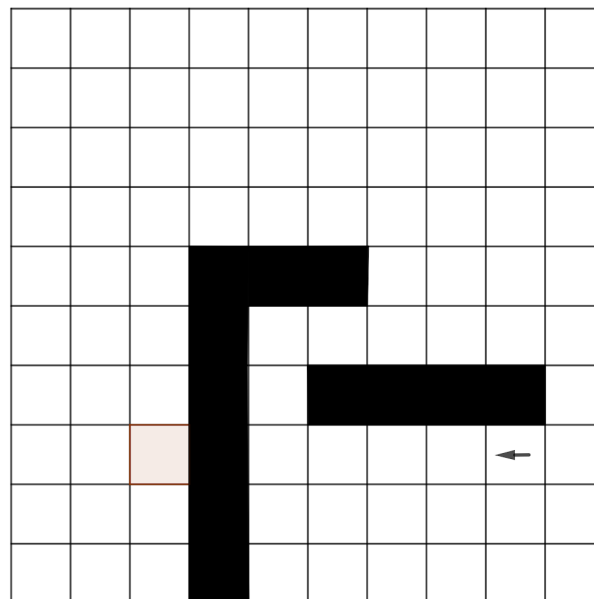
Teaching Instructions

Create a number of obstacles in the grid, representing walls in a maze. Select another learner to be the robot and set a new starting and finishing points. Explain that the robot cannot get to a square with an obstacle. Mix up the groups and let them write new sequences of instructions.

Suggested Guidelines

- If learners are not getting the solution you can repeat the activity with other robots, changing the obstacles and mixing up the groups to encourage peer learning.

Student Instructions

The black squares in the grid are walls which the robot cannot get to or cross. Using the same instructions, write a sequence of instructions so that the robot can get to the highlighted square from the new starting position:

Activity: Adding Instructions and Other Obstacles

Objectives

To develop creativity and problem posing skills.

Expected Outcomes

Learners will have defined new types of obstacles and instructions and posed problems to each other.

Teaching Instructions

Mix up the teams again. Learners should come up with their own type of obstacles to place in the grid (holes that can be jumped, etc) and new sets of instructions (jump a square, etc) and create problems for the rest of the groups to solve.

Groups take it in turn to pose a problem, describing their new obstacles and instructions, and one of their members becomes the robot. The other groups write sequences of instructions and test them on the grid. Repeat a few times with other groups.

Student Instructions

Come up with new possible instructions (jump a square, climb a wall, etc) and new types of obstacles (holes that can be jumped, etc) and create a problem for a friend to solve with a sequence of instructions.

Activity: Free Style

Objectives

To encourage creativity. To develop team-working skills.

Expected Outcomes

Learners will have taken the concept of the robot game and created a dance of some kind for the robot to follow

Teaching Instructions

Learners are now left with an empty grid and should create in new teams a set of instructions that are clear and simple to follow. They should then build a sequence of instructions that would make the robot perform a dance. Each team takes it in steps to quickly read out their set of instructions for a volunteer robot to dance within the grid.

Suggested Guidelines

- Encourage creativity in the instructions. Clap, jump, full turn, hop in one leg, etc.

Student Instructions

Imagine that you now have a grid with no obstacles. Create new instructions and build a sequence using your new instructions to make the robot perform a dance. The instructions should be clear and simple. Some examples could include clap, jump, full turn, hop in one leg, but you can create as many as you want. Try reading the sequence of instructions to a peer or friend to perform.