| Overall goal of the lesson | Children will learn about error detection and correction |
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| Prior knowledge required | - |

**MODULE 1:**          **Module time:** 35 minutes

| Goal: | |
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| Description: | Errors can occur whenever information is stored or transmitted. Data stored on disks and flash memory can be changed if there is a tiny fault in the device. Error detection techniques add extra information to data to determine when errors have occurred. Students will learn about one way to do this using a method that is called parity. |
| Material required: | **Physical:**<br>Chalk and blackboard/Marker or Whiteboard<br>1. One copy of the worksheet (Error Detection and Correction) per child.<br>2. Writing material to solve the worksheet: pencil and eraser.<br><br>**Electronic:**<br>Slidedeck for error detection and correction. |
| Procedure Summary: | 1. Distribute the worksheets (Error Detection and Correction) to the children.<br>2. Read through the slide deck and worksheet and discuss with the class the importance of parity it. |
| Procedure Details: | 1. Discuss importance of error detection using the examples on slides #2-3.<br>2. Ask students if something like this has happened to them? How would they react? Will they be happy? Annoyed?<br>3. Ask them if they like magic tricks. Tell them "I've just learnt a magic trick I want to show you". Call one of the students to assist you.<br>4. Draw a large 5 x 5 grid on the black/white board. ( slide #6)<br>5. Now ask the assistant to randomly fill up some of the squares in the grid. He can take help from other students to make sure there is no pattern and that the squares are randomly filled up. ( slide #7)<br>6. Now tell the students: "I'm going to make this a little bit harder by adding another row and another column". (slide #8)<br>Of course, you are doing this on purpose because what you want to do is make sure that the number of black squares showing in each row and column is an even number. This is always possible; if the student colored an odd number of black squares in a row, you add another black square; if the student put an even number in the row, add a white square, to keep it as an even number. Remembering that zero is an even number.<br><br>You should practice this several times before doing it in front of the class, as it becomes a lot easier to make it look casual when you've done it before.<br>7. Now tell the assistant to reverse any one of the boxes. Show them how to (slide #9)<br>8. Now revert back to the grid at the end of step 6. Ask the assistant to change any square when you are not looking (close your eyes or walk away – do not look!)<br>9. Tell the class that using magic you will identify which box has changed. |

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| | 10. Once the assistant has changed a square, come back to the grid and pretend to do magic. Check which row and column have odd number of black squares. The intersection of the row and column will be the modified square. Point to the same and ask the class if you are right. |
| | 11. Revert back to grid at the end of step 6. Play the magic trick again. |
| | 12. Now ask them if they could figure out how the trick worked? Ask them if they see any patterns (slide #13) |
| | 13. Point out that all the blacks in each row and column are even (slides #14,15) |
| | 14. Reveal the secret that you made them even in the row and column you added. (slides#16,#17) |
| | 15. Highlight that if we can detect such changes, we should be able to automatically fix them. Addition of extra information is called parity ( slide #18,19) |
| | 16. Give more examples of how errors occur all around us. Ask students for more examples. |
| | 17. Ask them to create a random grid and add parity bit and recreate the magic. Repeat this activity several times. |
| | 18. Distribute Worksheet. |
| **Assessment:** | Questions from the worksheet |
| **Information Broadcast:** | In Computer Science, the children learn method of error detection and correction using parity bit. |