



1 Introduction

In 2019, NDRI initiated connecting the schools from every province through Skype video conferencing in a regular manner. The communication is made with computer teachers and the students addressing the difficulties they are facing relating to computer labs and resources provided with and the way of teaching. There seems to be a lack of Computer education in almost every school and the complete absence of resources and materials.

The program incorporated an efficient utilization of unplugged activities as a method of gaining knowledge, innovation, and building capacities in schools of Nepal.

OBJECTIVES

The main objective is to enhance and upgrade the traditional way of teaching and learning methodologies by integrating School AI unplugged activities in their academic curriculum.

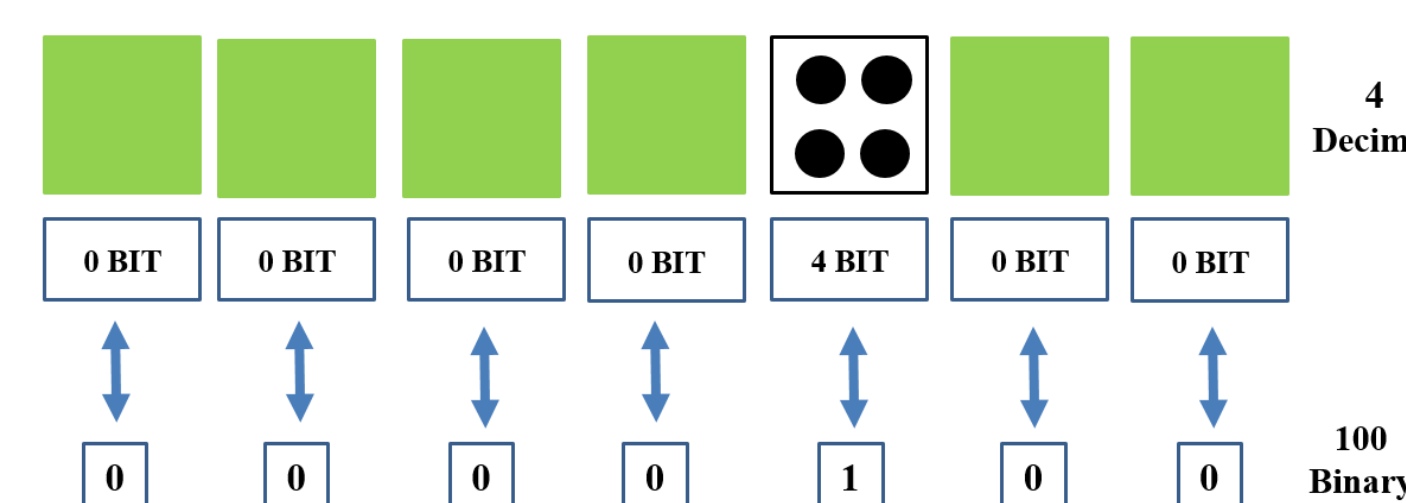


Figure: Binary of decimal 4 is 0000100

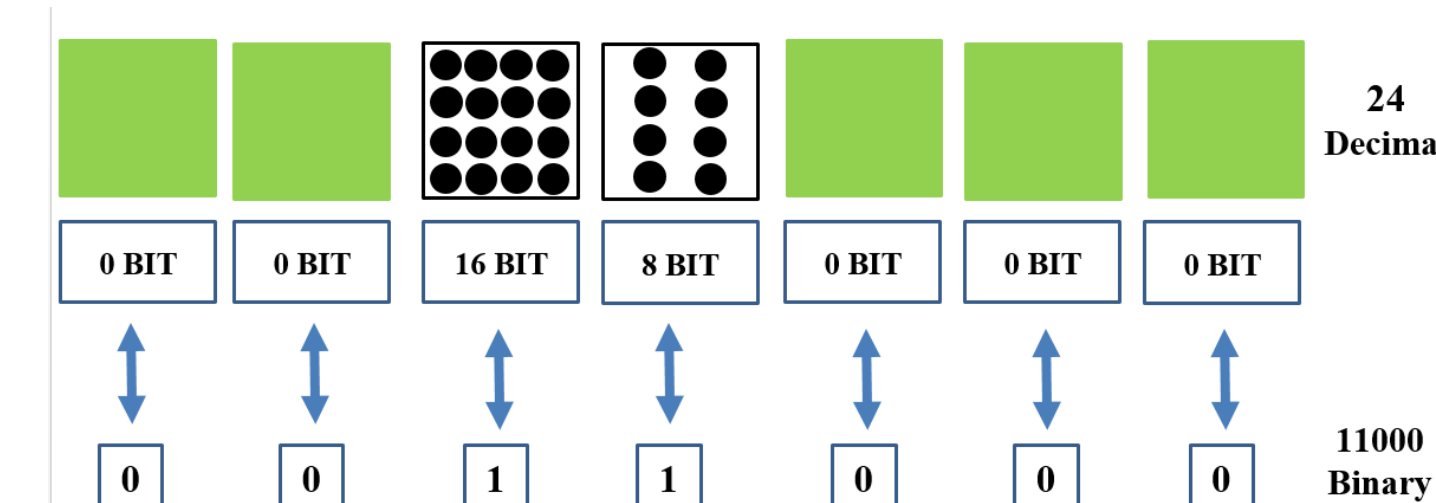
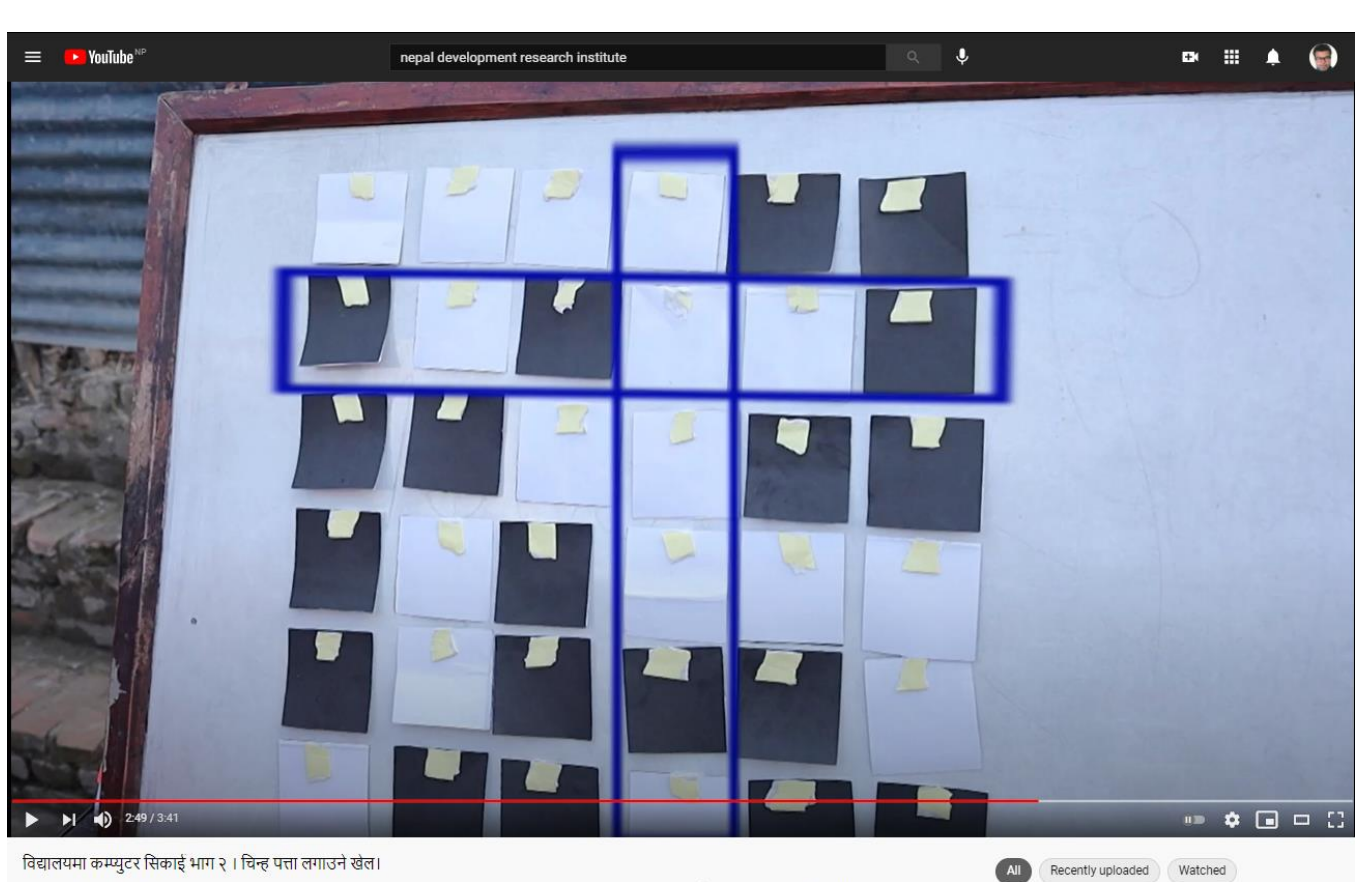


Figure: Binary of decimal 24 is 0011000

2 Unplugged Activities at School

2.1 Game of Finding Sign

There are multiple ways of searching the given keywords from the computer's database. Game of finding the hidden and marked sign is based on one of the searching mechanism in computer. This procedure of searching is shaped into an unplugged activities at school in which student's group collaboration is required and played with logics. This enhances the student's thinking capabilities that enriches the possibilities of new innovations.



Images: YouTube clip of School AI Unplugged Activities on Finding Sign

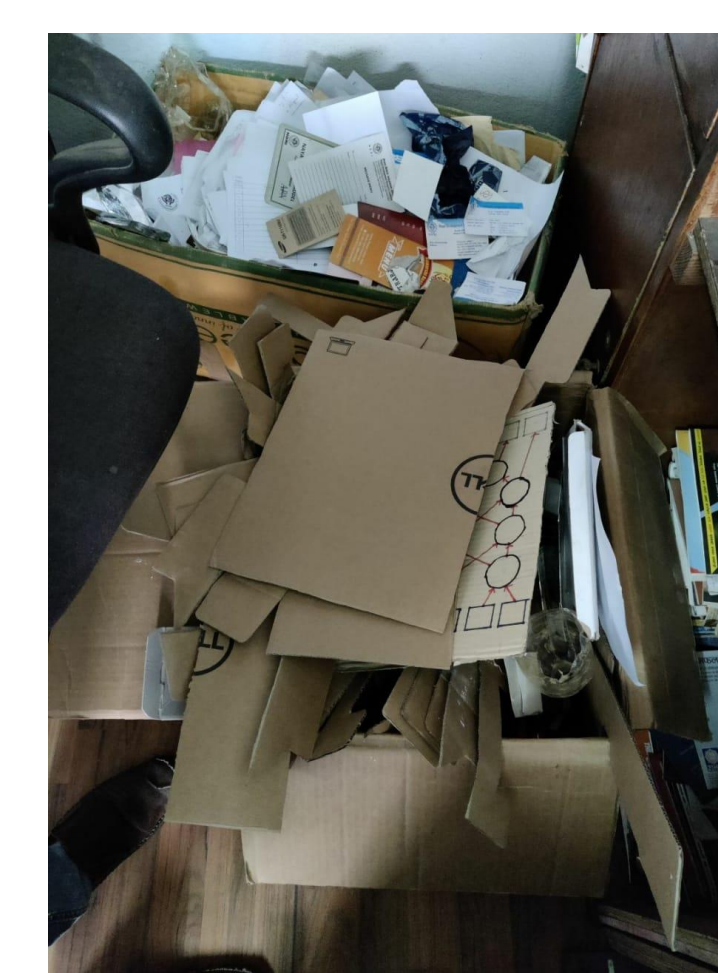
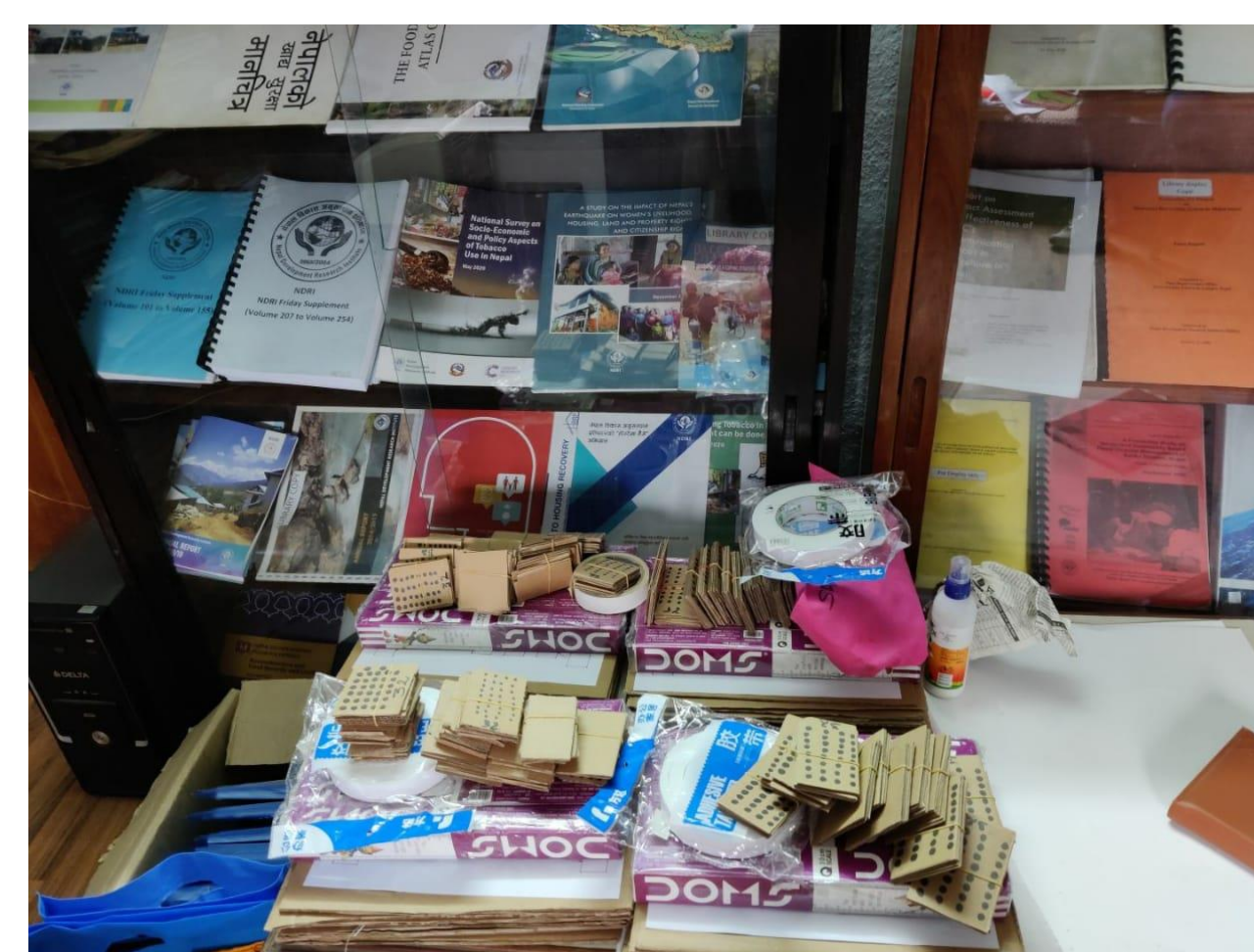
Algorithm for Finding Sign

- Step 1:** The cards with different colors at both end say black and white, are arranged in 5*5 matrix randomly.
- Step 2:** The odd colors at each row and column are adjusted to even by adding 1 more row and column to the matrix.
- Step 3:** Now allow someone to choose any number from the given matrix secretly, flip the card to other side and mark the sign behind it.
- Step 4:** Here the flipped card or the sign behind it should be revealed.
- Step 5:** Now the rows and column with odd number of same color is selected.
- Step 6:** The selected row and column will intersect at a point/card and that card is the flipped/marked one.



Images: YouTube clip of School AI Unplugged Activities on BITS

2.3 Materials Used



Images: Using reusable materials for developing School AI educational contents

All the required materials for developing sorting network game play board and tiles are used from reusable and waste materials as shown in images above (eg. Laptop boxes, cardboards from kitchen waste, waste papers, etc.). These prepared set of game is then disseminated to the students of grade six and above at school. They are encouraged to develop such educational games from reusable materials that are easily available around under parental guidance.

3 Results and Discussion

- The unplugged activities at school like finding of sign using simple searching trick and the simplest way of Binary Number Representation have shown the positive impact on traditional way of teaching and learning methodologies. Both teachers and students seem interested to get involved in these kinds of curriculum based games and group activities.
- The result have shown the enhancement in the thinking capability of students and come up with more creative and innovative ideas supporting study as fun. Therefore, the present school curriculum must be updated with student-centric features and integration of School AI unplugged activities to get positive growth in education system.

4 Conclusions and Recommendations

- Every players seems interested in playing curriculum based unplugged games and come up with real concept of algorithm that is being used by computer.
- The easily available reusable and waste materials found around are successfully seems to be used by the players in order to perform play.
- This sort of curriculum based unplugged activities/game is supposed to built/enhance the thinking capabilities and may lead to creative and sustainable innovations.

Acknowledgement:

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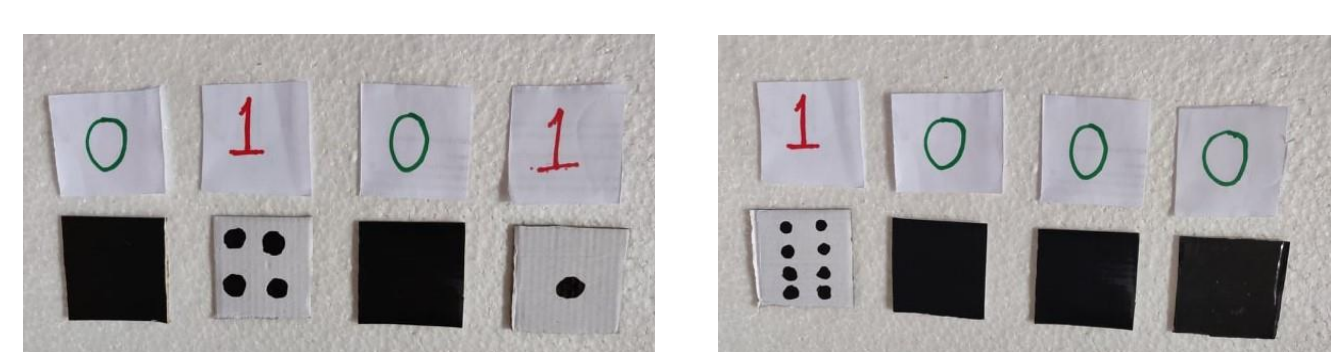
References:

- Fed ex Tech talk: Hour of Code <https://hourofcode.com/np>
- Finding Sign; Unplugged activities at Schools of Nepal by NDRI https://www.youtube.com/watch?v=OzPOT-1oen8&ab_channel=NepalDevelopmentResearchInstitute
- BITS; Unplugged activities at Schools of Nepal by NDRI https://www.youtube.com/watch?v=BaUnFc37PtQ&t=142s&ab_channel=NepalDevelopmentResearchInstitute

2.2 BITS

This unplugged activity represents the decimal number to binary and vice-versa. Here, for the purpose two sided face card is made, one side with green color that represents zero i.e. off stage and the other side representing bits values, one i.e., on stage.

These cards are placed in an order and is turned on the desired decimal number keeping other cards in off stage. The order is counted as 1 for on cards and 0 for off cards and hence it is converted to binary. This is the way computer stores huge amount of data in its categorized memory.



Images: Hand made education material for decimal to binary conversion

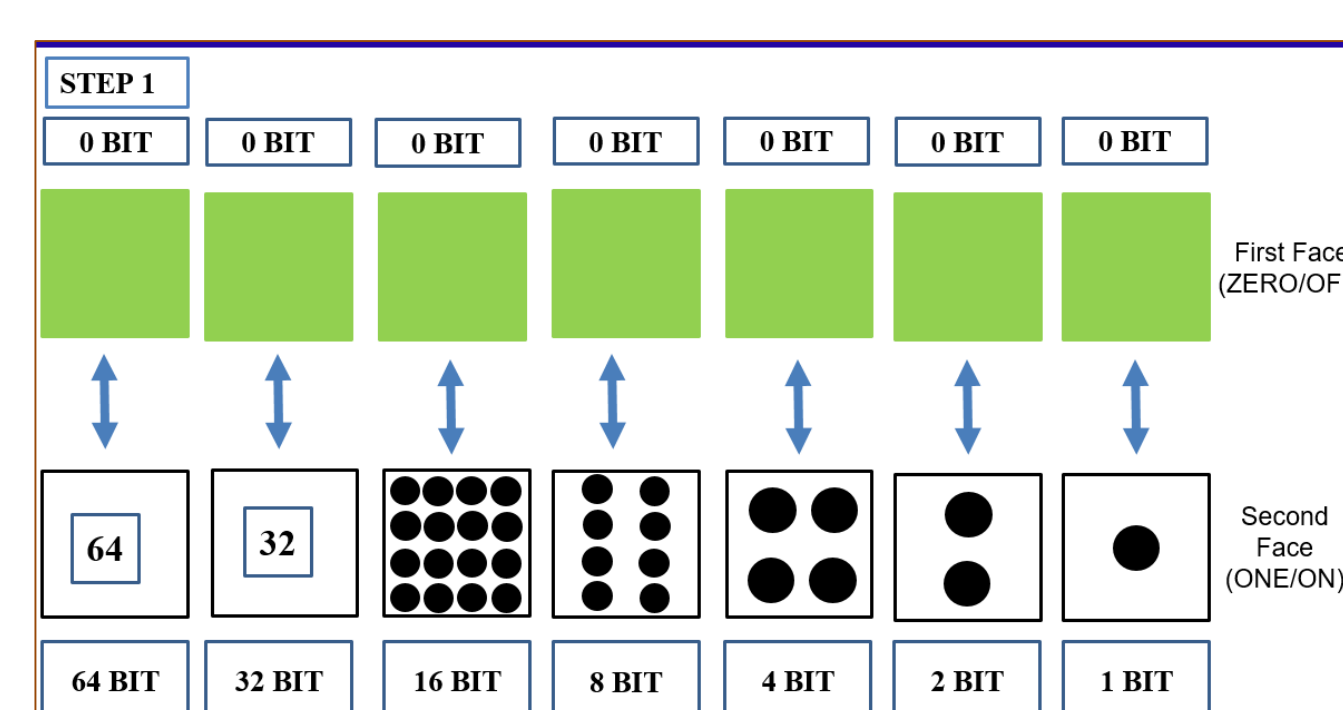


Figure: Double sided BITS cards

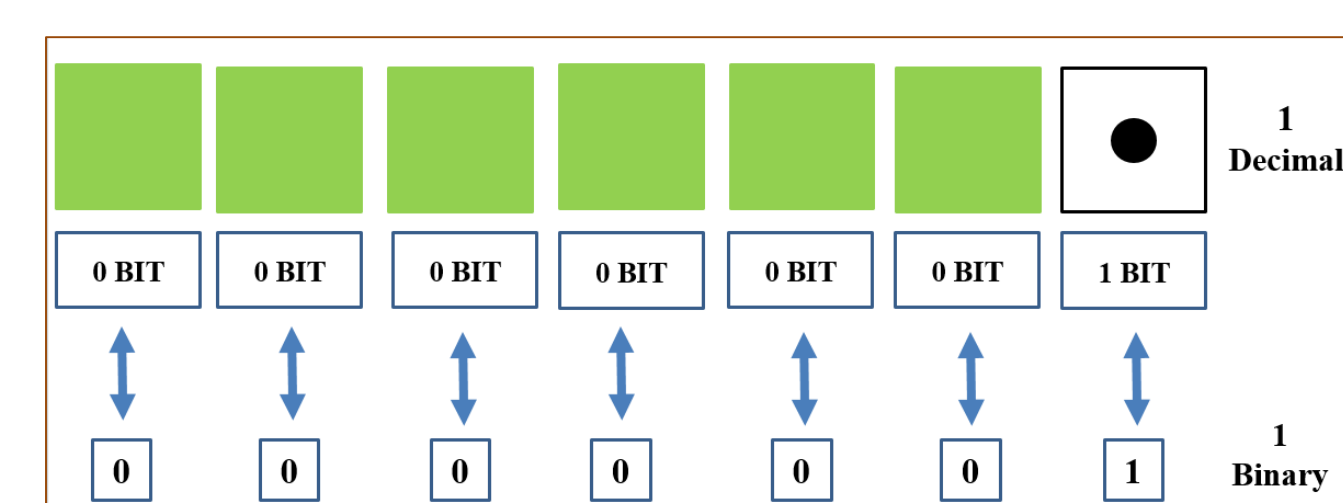


Figure: Binary of decimal 1 is 0000001

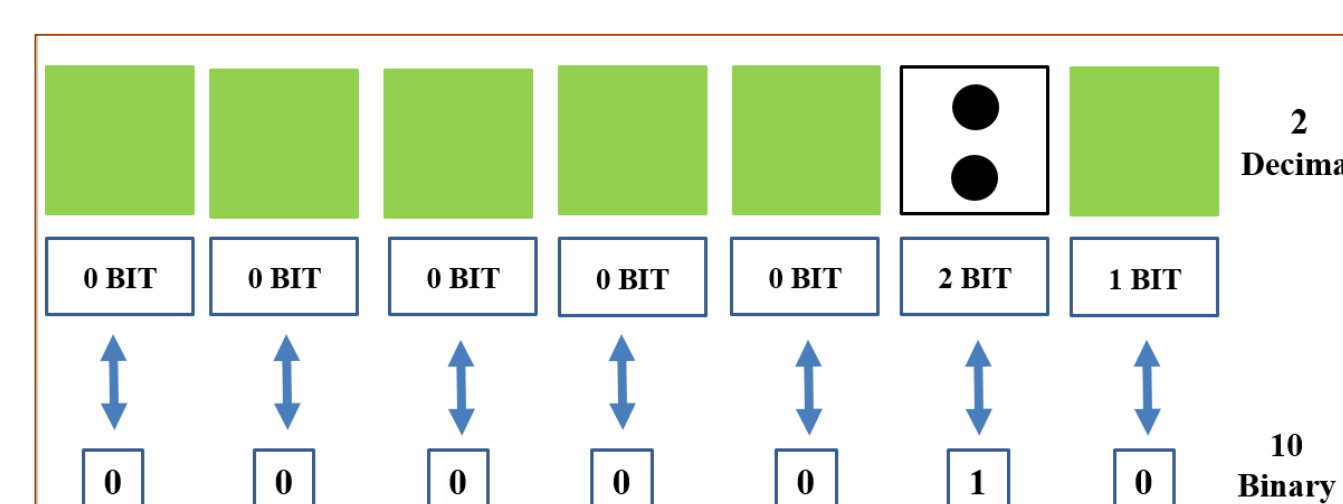


Figure: Binary of decimal 2 is 0000010