Properties of "planar binary (butchi number)

Properties of "Planar Binary (Butchi Number)"

Yuuki Iwabuchi, Junichi Akita

Division of Electrical Engineering and Computer Science, Kanazawa university
butchi@merl.jp,akita@is.t.kanazawa-u.ac.jp

1 Introduction

Conventional binary numbers has the carry rule of leftward propagation in linear array. In this paper, we propose the number representation with the carry rule of both leftward and upward propagations in planar array, which we call "planar binary (Butchi number)," and we describe their properties.

2 Property of "Planar Binary"

In the procedure of increment in "Butch number," the carry paths branch for both leftward and upward at the reversing bit accroding to propergating carries. The arithmetical operations of addition and multiplication can be defined for the Butchi number, that satisfy both the commutative law and the distributive law. The Butchi number representations for large natural numbers generally have recursive triangles shapes. The Butchi number representation can be considered as the extension of the binary number in one dimentional representation for two dimentional representaion. The possibility of the operation representation with simple rule in two dimentional domain will be discussed in our future works.

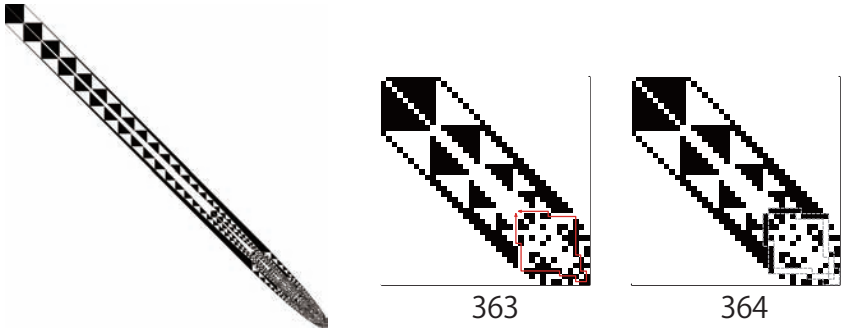

Fig. 1. Examples of Planer Binary's property. (a)Representation of 40000 and (b)Incremental Operation.