AN INTRODUCTION OF COMBINATIONS AND PERMUTATIONS WITH GOOGLE SPREADSHEET'S GOOGLE SCRIPT

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ABSTRACT

This paper demonstrates the use of Google script in connection Google sheets. Two example student level problems, combinations and permutations, are presented. The example problems are presented with Google script code provided along with the underlying rationale. The code was developed on a Chromebook. The emphasis is on code, which is based on JavaScript and in some instances, specific to the Chromebook sheets environment.

Keywords: *Spreadsheets, Google script, Code, Chromebook, JavaScript, Combinations, Permutations*

1. INTRODUCTION

One of the most well-known applications in business is the Excel spreadsheet, and more importantly, the accompanying language VBA. A growing number of students are adopting the Chromebook based on cost and exposure. A common difficulty in learning and the classroom experience is a feeling of unfamiliarity of the tools and material.

This paper demonstrates that there is a similar experience, if not for personal uses, with Google sheets and Google script. The demonstration problems are based on the familiar concept of combinations and permutations that many students have been taught by the time of university matriculation. String manipulation requires the use of several functions of Google scripts, which requires the interaction with a Google spreadsheet.

2. COUNTING COMBINATIONS USING GOOGLE SHEETS AND SCRIPTS

2.1 Problem

This paper visits the concept of combinations. Given a string of characters {A,B,C,D,E}, how many combinations of size 3 can be listed? By familiar formula, the number can be calculated.

FORMULA FOR COMBINATIONS OF 3

Figure 1

$$_5C_3 = \frac{5!}{3!2!}$$

2.2 Process

The binary system has been often described by its "on-off" property, where "on" is represented by 1 and "off" by 0. Graphically, we extend this notion by seen and unseen as depicted in Table 1. The binary masks out characters by a 0 value. Otherwise, a binary 1 causes a character to be seen. Examples of the subsets are (ABC), (ACF), (DEF).