

## COMPUTER SIMULATED WOVEN FABRICS DESIGN

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### ABSTRACT

The satisfaction of all the types of tastes of the consumers, the traders and the special needs of mankind is impossible in textile word. To produce a fabric you have to make a sample and this sample should withstand a list of variations and changes until it pass the pre-requisite standard demands. Practically this should undergo a prolong, tedious, expensive and time-consuming procedures.

This paper developed AC-language software Program simulating a fabric capable to respond to all changes and variations needed. From now and good any fabric for any purpose with the possibility of making all changes and alterations could be produced by using this package of software. This package as well would enable the free- style designers to produce their fabrics with a wide span of freedom.

### المخلص:

إرضاء أذواق المستهلكين والتجار والاحتياجات الخاصة يعتبر مستحيلاً في عالم النسيج. لكي تنتج قطعة من القماش يجب أولاً أن يتم إنتاج عينة لذلك القماش حيث تجرى لهذه العينة مجموعة من التغييرات والتعديلات حتى توافق هذه العينة المواصفات القياسية المطلوبة. عملياً هذا الجزء هو من أصعب الأجزاء حيث يأخذ زمناً طويلاً وإجراءات معقدة ومكلفة. هذه الورقة أنشأت وصممت برنامجاً حاسوبياً يحاكي عملية إنتاج قماش بحيث يمكن إجراء كل التعديلات والتغييرات المطلوبة على هذا القماش. منذ الآن ولاحقاً يمكن باستخدام هذا البرنامج إنتاج أي أنواع من الأقمشة ولأي نوع من الأغراض مع إمكانية إجراء أي تعديلات على هذه الأقمشة. هذا البرنامج أيضاً يمكن المصممين من مدارس الطراز الحر من إنتاج أقمشتهم وبتيح لهم مساحة كبيرة جداً من الحرية في التصميم.

### INTRODUCTION

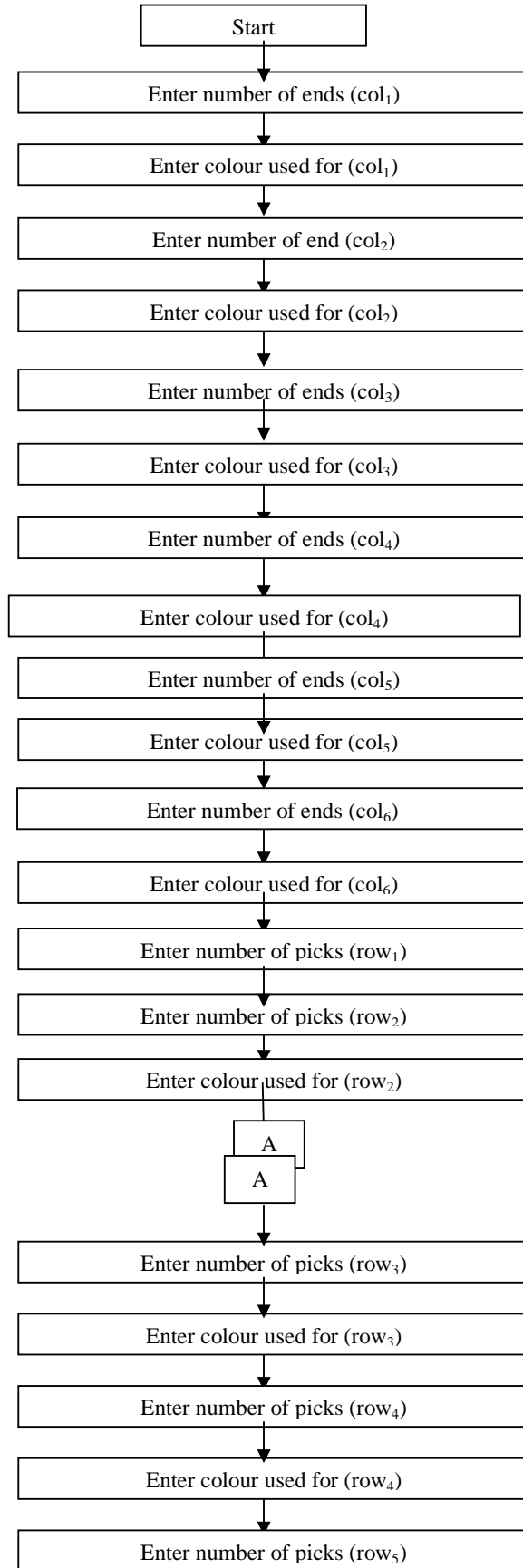
CAD involves any type of design activity that uses the computer to develop, analyze, modify, or enhance an engineering design. CAD systems are based on interactive computer graphics. The engineer creates an image on the monitor by entering commands to the computer and the interacting with the program take place. It must be noted that CAD is an engineering design tool. The method of creating engineering graphics has changed, regardless of the type of the system used, but the drawings remain the most common forms of output.<sup>[1]</sup>

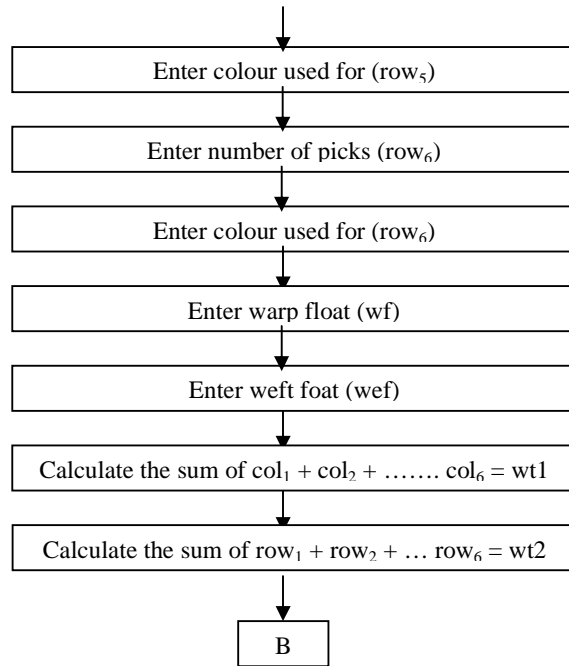
CAD can be used for bold and subtle designs as well as for organics and geometrics. A craftman creates a free design on the screen and the pattern can be woven directly with an unlimited number of threads. It is possible to show buyers of designs the possibilities of different looks of colours<sup>[2]</sup>. On CAD systems any sequence of selection to produce the required design can be simulated as a grid on the monitor. Each square on the grid is given a colour corresponding to woven thread. Computers are thus able to give a visual image of the striped or checked fabrics. Both colour and sequence are easily changed as the design process is refined<sup>[3]</sup>. Monarch Computex in the US offers the Point Care family of a software that can develop the design and manufacturing processes while interfacing with Dobby and Jacquard looms<sup>[4]</sup>.

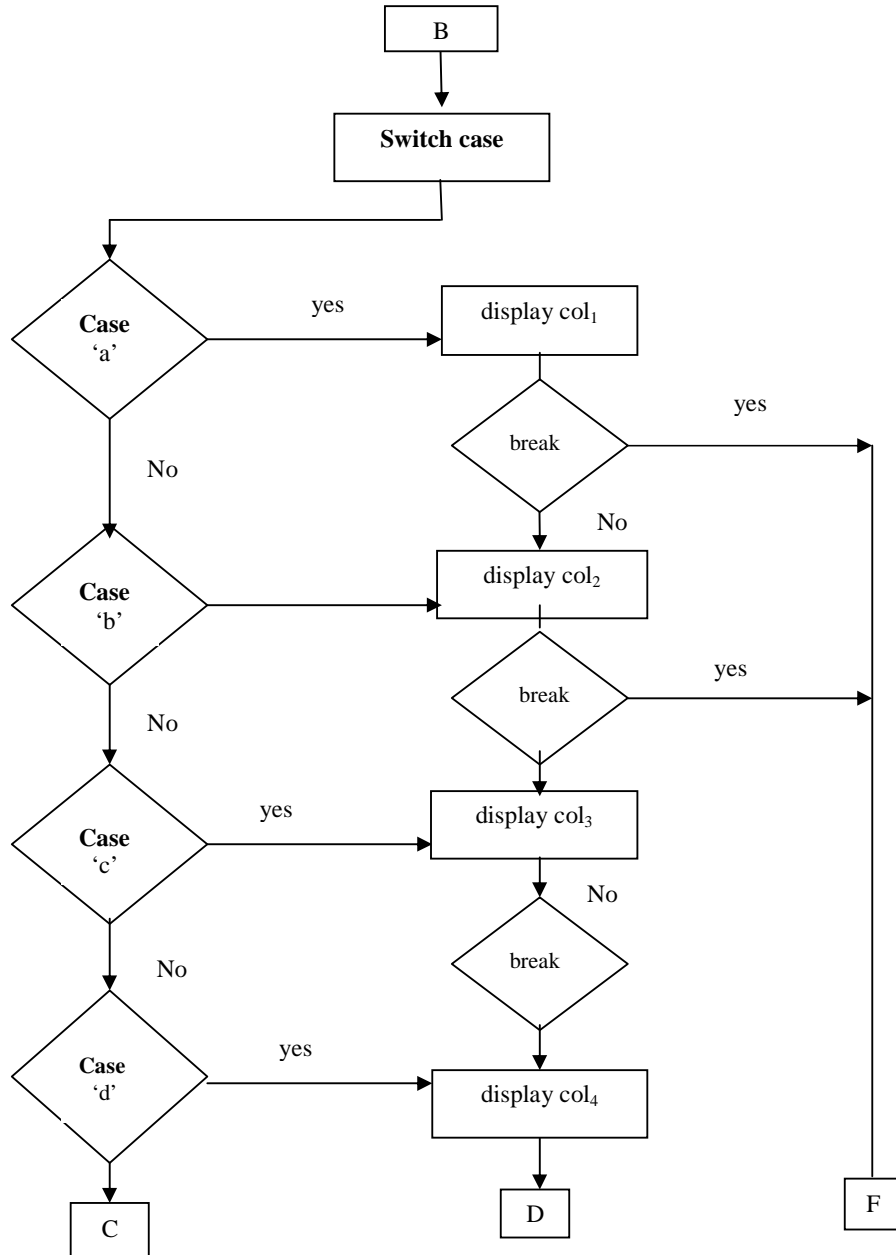
## **MATERIALS AND METHODS**

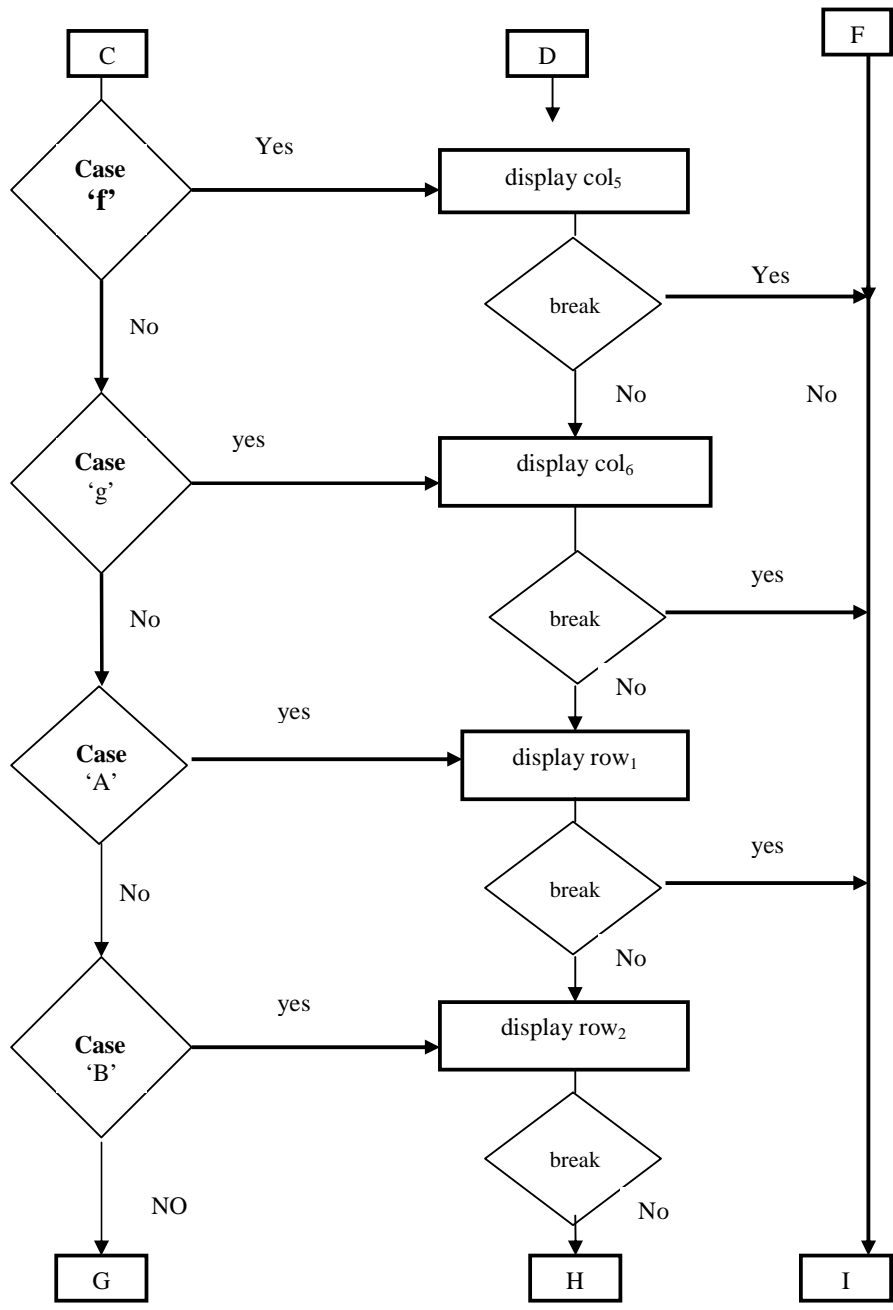
**Computer Interact:** The interface between the user of this program and the computer itself must be paid special considerations. Without computer interaction the communication between the user and machine will not be achieved and the user will get a loss. A menu with five options is used and chances are offered to select an option from the menu. **Colour Matching. Program for Plain Weave Derivatives:** This software has been developed to simulate the effect of colours on the structure. Various colours can be used in warp as well as in weft, which enable the designer to select any colour from colour palette and gives the realistic image to final product before fabrication. By using this software, fabrication processes are eliminated, production costs are reduced and time is saved. The user can select the design required to be fabricated from the menu. Then the program will call the function responsible of generating such design. The required data will be entered such as the number of ends followed by the colours selected for ends as well as the number of picks and the colours selected for the picks. The switch case is used to shift from block to another while the block referred to the number of ends or number of picks having the same colour. Each colour is represented by a letter see (Fig. 1). The lower-case letter is used to control changes of warp colour and upper-case letter is used to change weft colour.

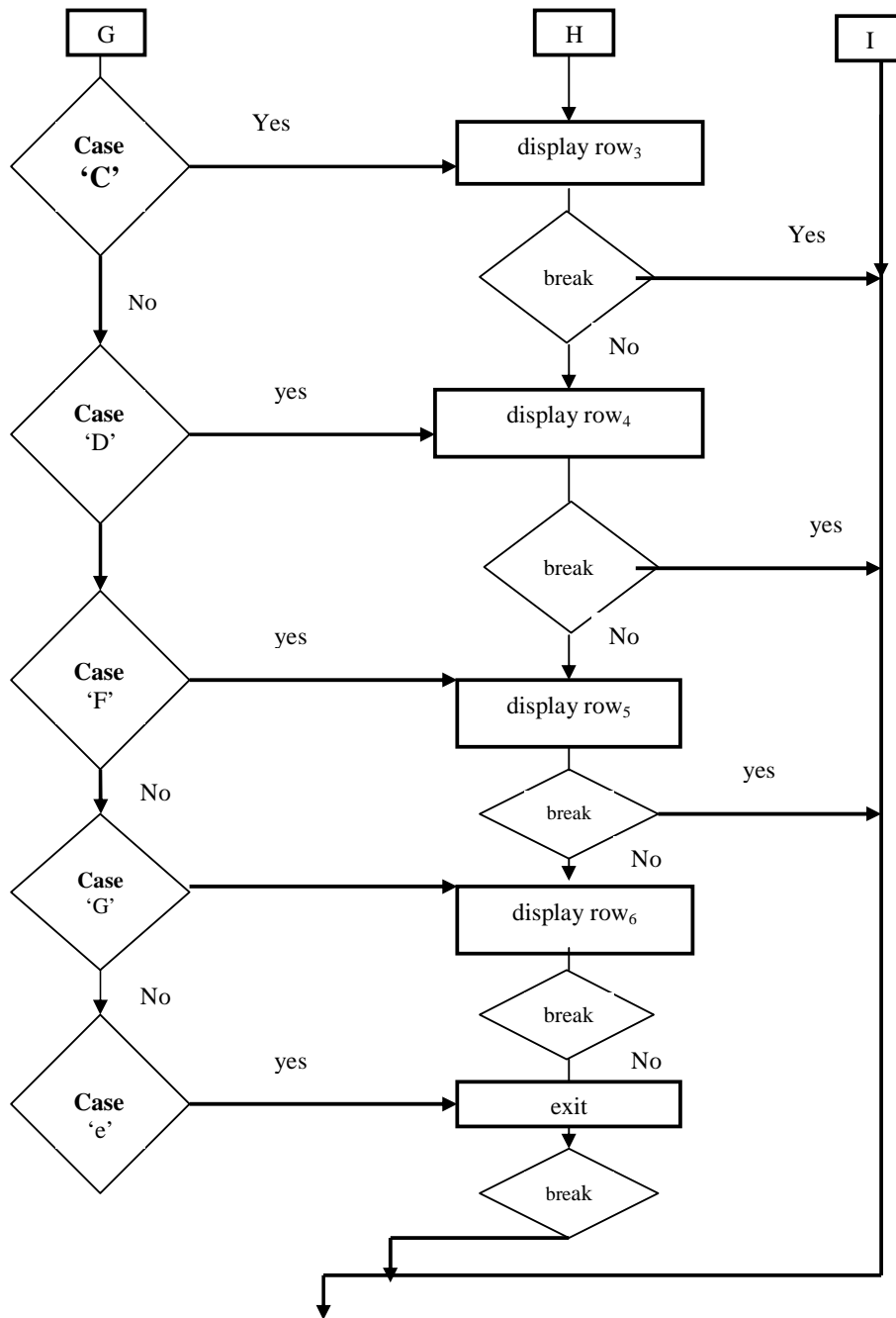
**Fig. (1): Algorithm of Software Used for Colour Matching**











## RESULTS

The three samples of fabrics namely warp rib, weft rib and hopsack were tested by using this software. The result showed that the fabric can be simulated and visualized on the screen using different colours according to desires of consumers. The traditional method will no longer be used. The (Fig. 2) illustrates the warp rib, with different colours used for warp ends as well as for weft picks. The arrangement of colours is shown below:

### Arrangement of warp colours

Warp Colours      LB    B    LB    B    LB

Warp ends            16    16    16    16    16

### Arrangement of weft colours

Weft Colours        B    LB    R    LB    B

Weft picks            16    16    16    16    16

(LB = Light Blue, R = Red, B = Blue)

(Fig. 3) represents weft rib with various colours used for warp as well as for weft. The arrangement of colours is indicated below.

### Arrangement of warp colours

Warp Colours        B    R    B    R    B    R

Warp ends            10    10    10    10    10    10

### Arrangement of weft colours

Weft Colours        B    R    B    R    B

Weft picks            10    10    10    10    10

(B=Blue,R=Red) .

(Fig. 4) represents Hopsack with various colours used for warp and one colour used for weft. The arrangement of colours is indicated below.

### Arrangement of warp colours:

Warp Colours        B    LR    B    LR    B    LR

Warp ends            10    10    10    10    10    10

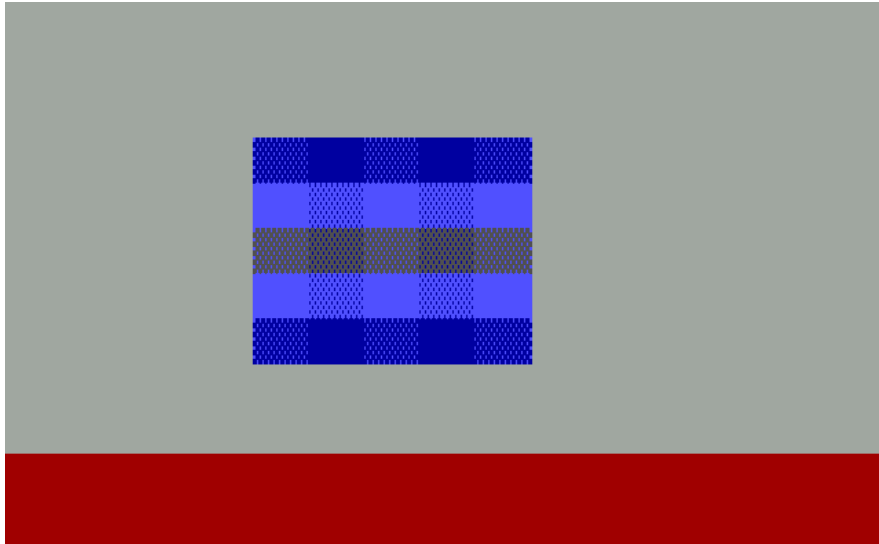
### Arrangement of weft colours:

weft Colours        B    LR    B    LR    B    LR

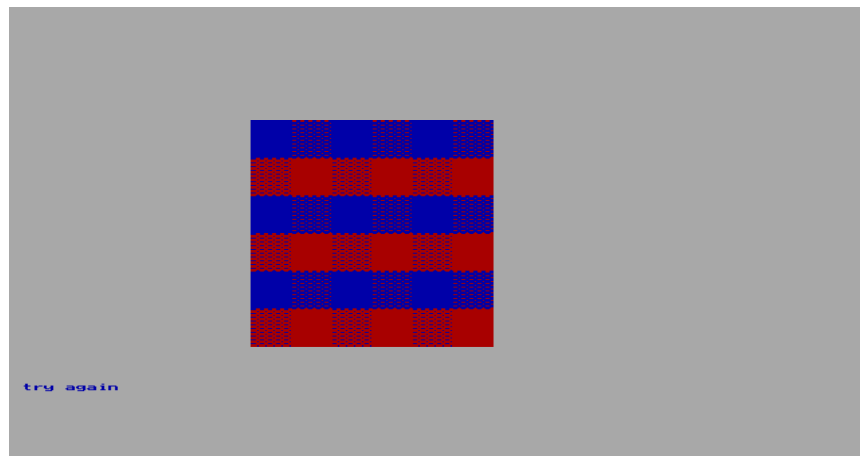
weft picks            10    10    10    10    10    10

(B= Blue,LR=Light Red).

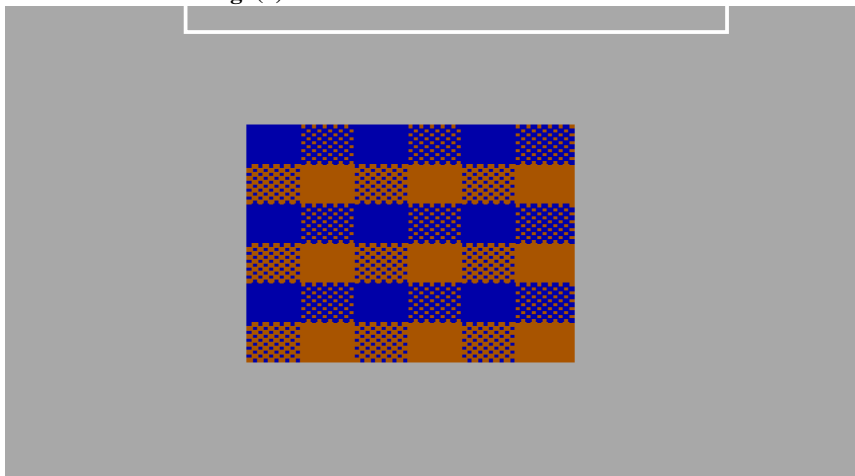




**Fig. (2): Warp Rib Structure with Colours Effects**



**Fig. (3): Weft rib Structure with Colour Effect**



## CONCLUSION

Many software packages are available and are commercially used in textile industry. The previous software packages used for colour matching were capable to change the colours of one thread at once, which required a lot of time to change the colours of the whole threads taking part in the fabric especially when the repeat is big. While this software has the capability to change the colours of a number of threads at one time, also the designers without basic knowledge of textile design could use this software to simulate, to create, to change and to modify samples according to consumer's desires and needs.

## REFERENCES

- 1- **Lamit, Gray Louis and Kitto, L. Kathleen** (1997). Engineering Graphics and Design. West Publishing, pp 14-18.
- 2- **Cadham, Eyolfson John** (1987). An industry First. Canadian Textile Journal, Vol. 6, p3.
- 3- **Aldrish, Winifred** (1992). **Fig. (4): Hopsack Structure with Colours Effect** CAD in Clothing and Textiles. Hartnolls Ltd, Bodmin England, p81.
- 4- **Fadi ElMoula, Abdalla Idris** (2002). Computer simulation for production design and properties of woven fabric. PH.D thesis, University of Gezira, Wed medani, Sudan, pp 16-17.

