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## Experiment No 8: Design and implement an Embedded System that displays the factorial of a number (input through switch) on LCD screen using 8051 microcontroller.

**Stuff Required:** KEIL  $\mu$ VISION IDE, 8051 microcontroller, LCD screen.

### **Program:**

#### **C code:**

```
#include <lcd.h>
#include <stdio.h>
void slow(int d){
    int i,j;
    for(i=0;i<=1000;i++)
        for(j=0;j<=d;j++);
}

void toScreen(INT0, INT1, T0, T1){
    int num, i;
    unsigned long fact;
    char charTemp[16];

    num = (8)*(INT0^1) + (4)*(INT1^1) + (2)*(T0^1) + (1)*(T1^1);

    for(i=1;i<=num;i++)
        fact = fact*i;

    sprintf(charTemp,"%lu",fact);

    LCD_WRITE(charTemp, 0, 0);
    slow(100000);
}

void main()
{
    INT0 = 0;
    INT1 = 0;
    T0 = 0;
    T1 = 0;

    LCD_INIT();
```

```
        while(1){
            toScreen(INT0, INT1, T0, T1);
        }
}
```

### HEX code:

```
:0D0EB700256C7500C0801014181C0F01027E
:060ED00001090001080009
:100E7800E4FDFCC3ED9FEC9E5015E4FBFA0BBB00B0
:0F0E8800010AEB64644A70F50DBD00010C80E4B3
:010E97002238
:0C0EC400D2827F0A7E00120E78C28222C9
:100E3400A907E4F580C282C280C281E954F0440863
:100E4400F580120EC4E9540FC454F04408F580022E
:020E54000EC4CA
:100E1100C282C280C281758020120EC47F01120E6F
:100E210034900EC1E493FF120E34900EC3E493FF8D
:030E3100020E347A
:100E5600A907758001C282D280C281E954F0440993
:100E6600F580120EC4E9540FC454F04409F580020B
:020E76000EC4A8
:100E9800AE05EF6003430640430680AF06020E34FA
:100D9A008B408A418942AF05AD44120E98AB40AAF6
:100DAA0041A942120B5CFF6010120E5674012542D3
:0A0DBA00F542E43541F54180E422E2
:0F0EA800900EBDE493FF120E34E493FF020E345C
:100DEB00E4FDFCE4FBFAD3EB9FEE6480F8EA64804D
:100DFB009850070BBB00010A80EC0DBD00010CBC29
:050E0B0003E1BDE9DE7A
:010E100022BF
:040C39008F828E8395
:100C3D00AE04ED64017802C333CE33CED8F9FDACEA
:100C4D0006AE83E58264017803C333CE33CED8F983
:100C5D002DFDEE3CFCEB640125E0FFEA33FEED2FAC
:100C6D00FFEC3EFEE52964012FF52BEE3528F52A24
:100C7D00900001D3E582952BE52A6480F8E5836425
:100C8D0080985020AF82AE83EE3395E0FDFCAB2F04
```

:100C9D00AA2EA92DA82C120B758F2F8E2E8D2D8C73  
:100CAD002CA380CF7543FF75440E7545B7852F492D  
:100CBD00852E48852D47852C467B007A007930128C  
:100CCD00085C7B007A007930E4F544FD120D9A7FC3  
:060CDD00A07E86020DEB73  
:100D6F00C2B2C2B3C2B4C2B5120E11A2B2E4FE3304  
:100D7F00FFA2B3E4FC33FDA2B4E4FA33FBA2B5E463  
:0B0D8F0033752800F529120C3980E0B4  
:03000000020CE30C  
:0C0CE300787FE4F6D8FD758153020D2ADD  
:100B5C00BB010689828A83E0225002E722BBFE0297  
:090B6C00E32289828A83E49322CA  
:100B7500E88FF0A4CC8BF0A42CFCE98EF0A42CFC1F  
:100B85008AF0EDA42CFCEA8EF0A4CDA8F08BF0A49D  
:100B95002DCC3825F0FDE98FF0A42CCD35F0FCEBFC  
:100BA5008EF0A4FEA9F0EB8FF0A4CFC5F02ECD39C1  
:0F0BB500FEE43CFCEAA42DCE35F0FDE43CFC222E  
:10080000E54F2443F8E6054F22784030070278434D  
:10081000E475F001120C03020B5C2000EB7F2ED27A  
:10082000008018EF540F2490D43440D4FF30040BD0  
:10083000EF24BFB41A0050032461FFE55060021595  
:10084000500553E5537002055230070D7840E475AA  
:10085000F001120C03EF020BF1020DC47403D20776  
:100860008003E4C207F54F8B408A418942E4F5508A  
:10087000F552F553E55060077F2012083B80F5756F  
:1008800051FFC201C200C202C203C205C206C208B1  
:10089000120809FF700D3007057F0012084CAF5396  
:1008A000AE5222B4255FC2D5C204120809FF24D07B  
:1008B000B40A00501A75F00A785030D50508B6FF12  
:1008C0000106C6A426F620D5047002D20380D924DE  
:1008D000CFB41A00EF5004C2E5D204020A4CD20190  
:1008E00080C6D20080C0D20280BCD2D580BAD205E8  
:1008F00080B47F2012083B2002077401B5500040ED  
:10090000F1120800FF12083B020874D208D20680D8

:1009100095120800FB120800FA120800F94A4B7001  
:1009200006791D7A0B7BFF20022EE550602A7E009F  
:100930008E82758300120BC460060EEE655170F056  
:10094000C2D5EBC0E0EAC0E0E9C0E0EE120A93D005  
:10095000E0F9D0E0FAD0E0FB120B5CFF60AAEBC03C  
:10096000E0EAC0E0E9C0E012083BD0E02401F9D0A1  
:10097000E03400FAD0E0FBE5510460DCD551D980C9  
:10098000877BFF7A0A798FD202809C791080027966  
:1009900008C206C2088008D2D5790A8004790AC242  
:1009A000D5E551047002F551E4FAFDFFEFF1208008E  
:1009B000FC7B08200113120800FD7B1030000A1296  
:1009C0000800FE120800FF7B20EC3382D592D55040  
:1009D00013C3E43000069FFFE49EFEE42001039D64  
:1009E000FDE49CFCE4CBF8C201EC700CCFCECDCC86  
:1009F000E824F8F870F38017C3EF33FFEE33FEED11  
:100A000033FDEC33FCEB33FB994002FB0FD8E9EBF1  
:100A1000300105F8D0E0C448B201C0E00AEC4D4E08  
:100A20004F78207B0070C2EAB5510040BCC0E01294  
:100A30000A95D0F0D0E0200104C4C0E0C4B201C0E7  
:100A4000F0120824D0F0D5F0EB020874120C130950  
:100A50001153098B5808E24C08DE42098F4F099761  
:0F0A60004409974908F743099D550981460981C3  
:100A6F00450981470B3D5008E62D08EA2E090D2B4D  
:100A7F0008EE23090B200B262A08A64800000905BB  
:100A8F003F3F3F00790AA2D5200314300509B91062  
:100A9F00020404B9080104A2D52006025001042063  
:100AAF0002689202B550005034C0E07F2030031925  
:100ABF007F30A20272067205500F120AECC202C2F8  
:100ACF0006C205C2087F30800F300503E9C0E0126F  
:100ADF00083B300503D0E0F9D0E0B550CC30051716  
:100AEF007F30B9100C12083B7F583004077F788095  
:100AFF0003B9080312083B3002057F2D02083B7F24  
:100B0F00202008F87F2B2006F322920280CF286E38  
:100B1F00756C6C2900D2011208003001F8C20178FF

:100B2F005030D50108F60208A62D50434958120837  
:100B3F00002403B405004001E4900B389312082CF5  
:0D0B4F00743A12082CD20375500402098B71  
:100CEF00020D6FE493A3F8E493A34003F68001F29F  
:100CFF0008DFF48029E493A3F85407240CC8C33306  
:100D0F00C4540F4420C8834004F456800146F6DFD4  
:100D1F00E4800B0102040810204080900ED0E47E86  
:100D2F00019360BCA3FF543F30E509541FFEE493C9  
:100D3F00A360010ECF54C025E060A840B8E493A390  
:100D4F00FAE493A3F8E493A3C8C582C8CAC583CABB  
:100D5F00F0A3C8C582C8CAC583CADFE9DEE780BE73  
:010ED600001B  
:100BC400BB010CE58229F582E5833AF583E02250E6  
:100BD40006E92582F8E622BBFE06E92582F8E22230  
:0D0BE400E58229F582E5833AF583E493224A  
:100BF100BB010689828A83F0225002F722BBFE01E3  
:020C0100F322DC  
:100C0300FAE6FB0808E6F925F0F618E6CA3AF622F2  
:100C1300D083D082F8E4937012740193700DA3A370  
:100C230093F8740193F5828883E473740293686084  
:060C3300EFA3A3A380DF84  
:100DC400EFB40A07740D120DCF740A309811A89964  
:100DD400B8130CC2983098FDA899C298B811F6308F  
:070DE40099FDC299F5992267  
:00000001FF

## **Result:**

Factorial of the number input is printed on screen.