DOE HW-Week 12 (Name: Md Ariful Haque Miah, Ayoola Ayodegi)

**Problem 7.12**

Since each replicate would be considered as a Block so No. of replicates = No. of Blocks = 7.

factorial design, with 7 replications so total no. of observations are 112. There will be 16 corner points in each Block and each Block is replicated 7 times.

So, Each Block will contain 16 corner points as follow:

(1)

a

b

ab

c

ac

bc

abc

d

ad

bd

abd

cd

acd

bcd

abcd

These corner points are randomized within Block and Full replication within each Block.

The data analysis is shown in the attached (.rmd) file

**Problem 7.20**

We have factorial design.

Number of factors, k = 6.

Number of blocks, = 4.

Block size, = 16.

So, the effects chosen to be confounded with blocks are ABCF (design generators), CDEF (design generators) and ABDE (generalized interaction).

**Design** There would be 64 corner points. Corner points are (1), a, b, ab, c, ac, bc, abc, d, ad, bd, abd, cd, acd, bcd, abcd, e, ae, be, abe, ce, ace, bce, abce, de, ade, bde, abde, cde, acde, bcde, abcde, f, af, bf, abf, cf, acf, bcf, abcf, df, adf, bdf, abdf, cdf, acdf, bcdf, abcdf, ef, aef, bef, abef, cef, acef, bcef, abcef, def, adef, bdef, abdef, cdef, acdef, bcdef, and abcdef respectively.

From the Yate’s Table in R, the following design is made in 4 block’s and each block with 16 corner points.

Block-1 Block-2 Block-3 Block-4

ac

bc

d

abd

e

abe

acde

bcde

af

bf

cdf

abcdf

cef

abcef

adef

bdef

c

abc

ad

bd

ae

be

cde

abcde

f

abf

acdf

bcdf

acef

bcef

def

abdef

a

b

cd

abcd

ce

abce

ade

bde

acf

bcf

df

abdf

ef

abef

acdef

bcdef

(1)

ab

acd

bcd

ace

bce

de

abde

cf

abcf

adf

bdf

aef

bef

cdef

abcdef

ABCF CDEF ABDE

**Problem 7.21**

We have factorial design.

Number of factors, k = 6.

Number of blocks, = 8.

Block size, = 8.

So, the effects chosen to be confounded with blocks are ABEF (design generators), ABCD (design generators), ACE (design generators), BCF (generalized interaction), BDE (generalized interaction), CDEF (generalized interaction), and ADF (generalized interaction).

**Design** There would be 64 corner points. Corner points are (1), a, b, ab, c, ac, bc, abc, d, ad, bd, abd, cd, acd, bcd, abcd, e, ae, be, abe, ce, ace, bce, abce, de, ade, bde, abde, cde, acde, bcde, abcde, f, af, bf, abf, cf, acf, bcf, abcf, df, adf, bdf, abdf, cdf, acdf, bcdf, abcdf, ef, aef, bef, abef, cef, acef, bcef, abcef, def, adef, bdef, abdef, cdef, acdef, bcdef, and abcdef respectively.

From the Yate’s Table in R, the following design is made in 8 blocks and each block with 8 corner points / each block with 8 runs.

Block-1 Block-2 Block-3 Block-4 Block-5 Block-6 Block-7 Block-8

(1)

abcd

bce

ade

acf

bdf

abef

cdef

ab

cd

ace

bde

bcf

adf

ef

abcdef

abc

d

ae

bcde

bf

acdf

cef

abdef

bc

ad

e

abcde

abf

cdf

acef

bdef

ac

bd

abe

cde

f

abcdf

bcef

adef

c

abd

be

acde

af

bcdf

abcef

def

b

acd

ce

abde

abcf

df

aef

bcdef

a

bcd

abce

de

cf

abdf

bef

acdef

ABEF ABCD ACE BCF BDE CDEF ADF