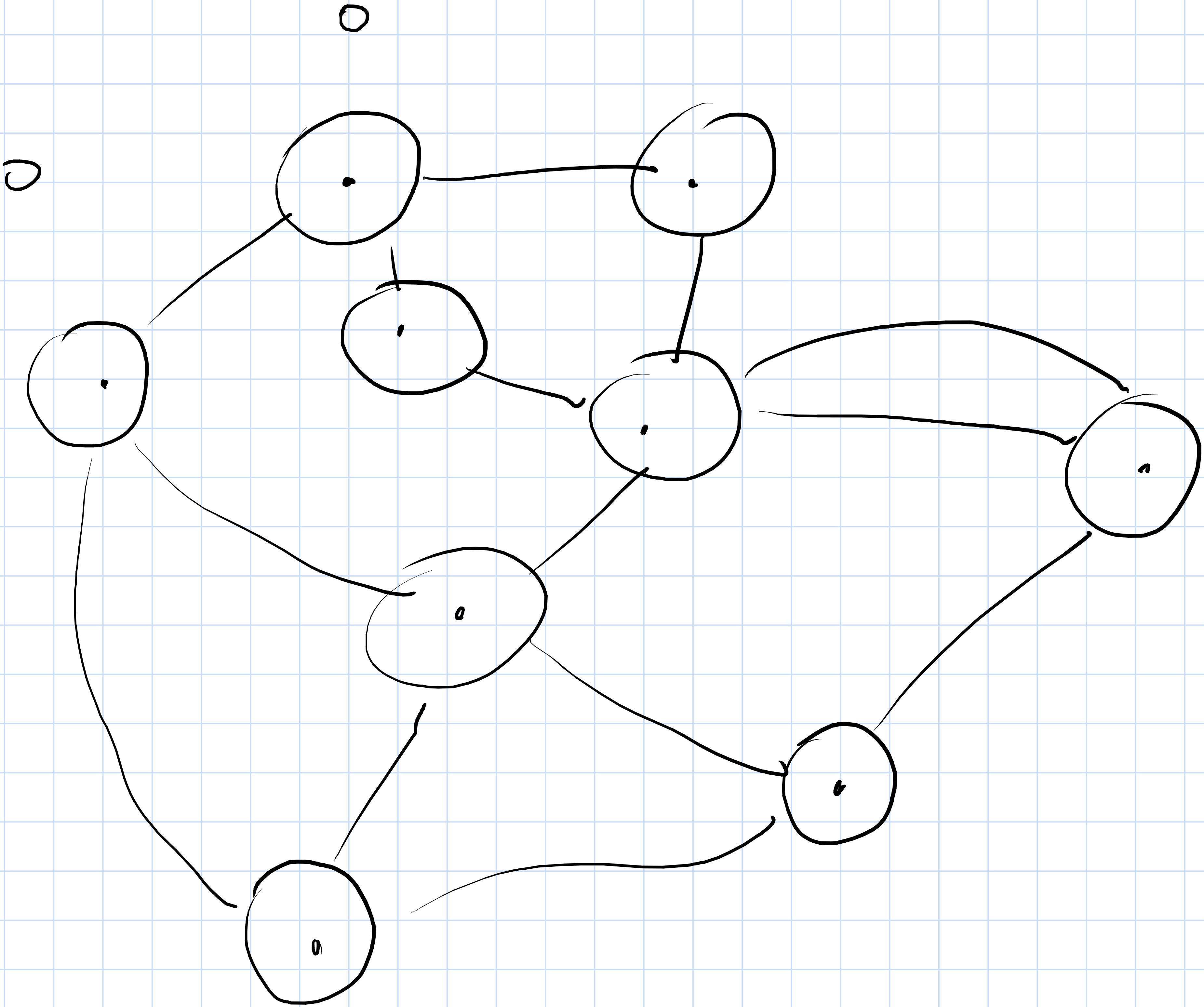
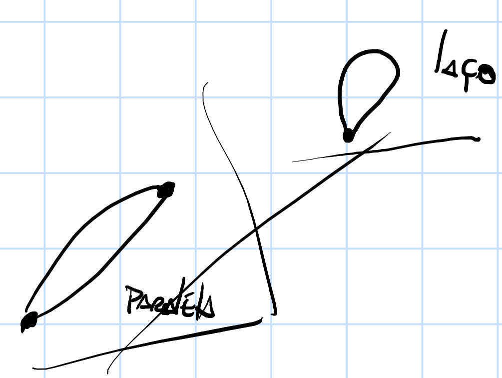
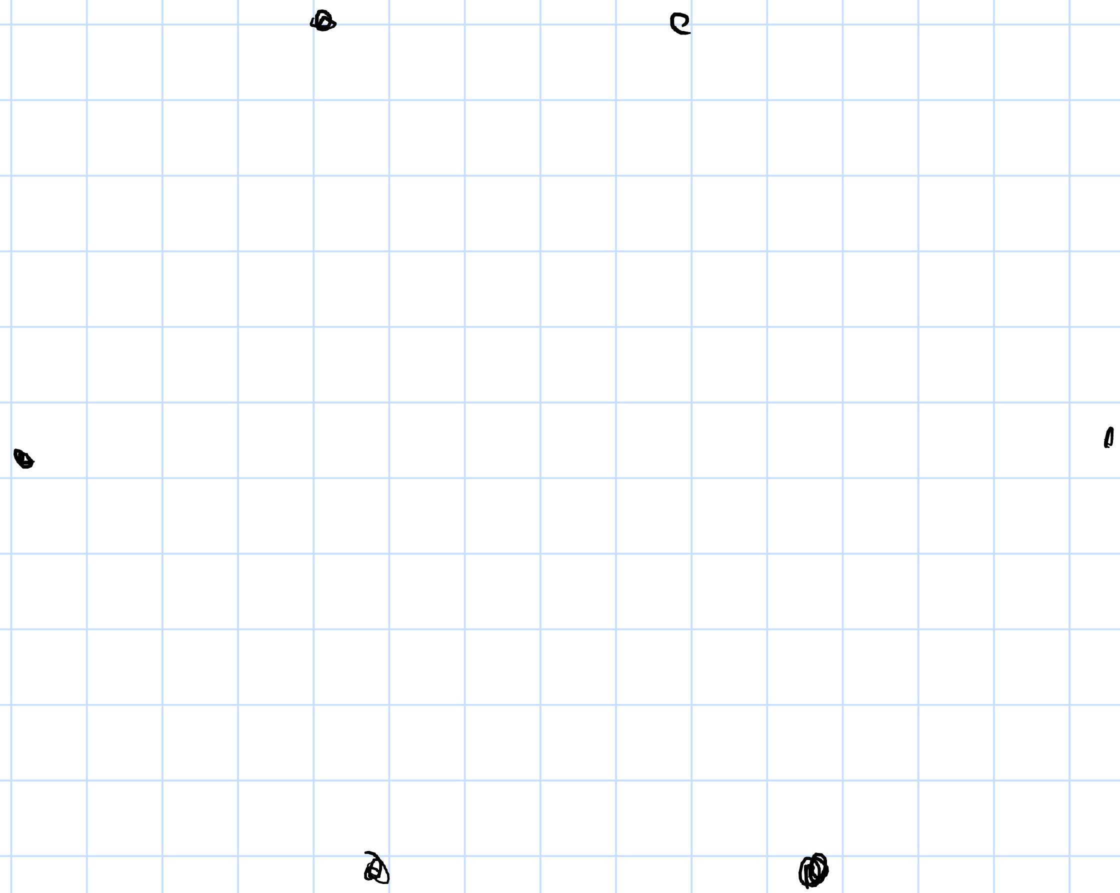


GRAFOS SIMPLES

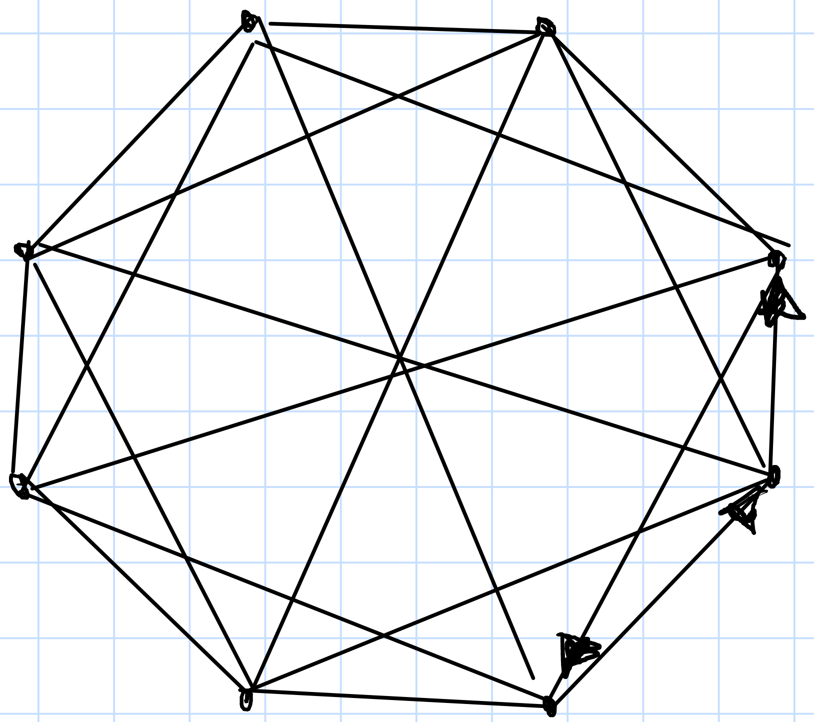
MULTIGRAFOS

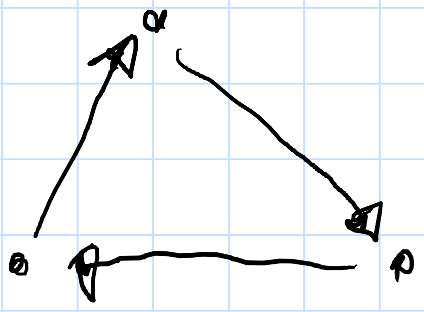


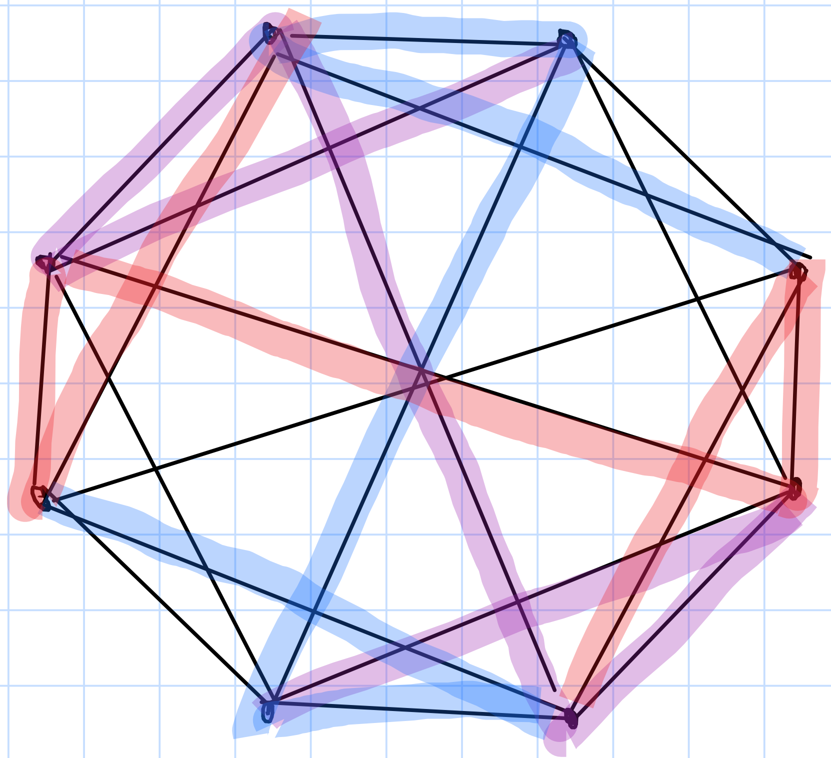


K_6 COMPLETO

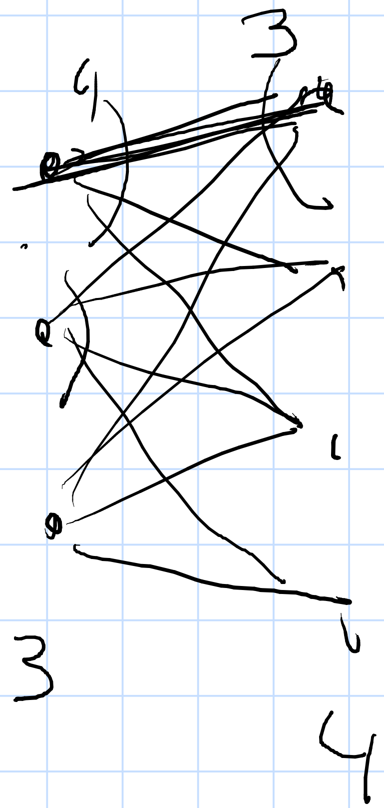
2^m → nº DE ARESTAS





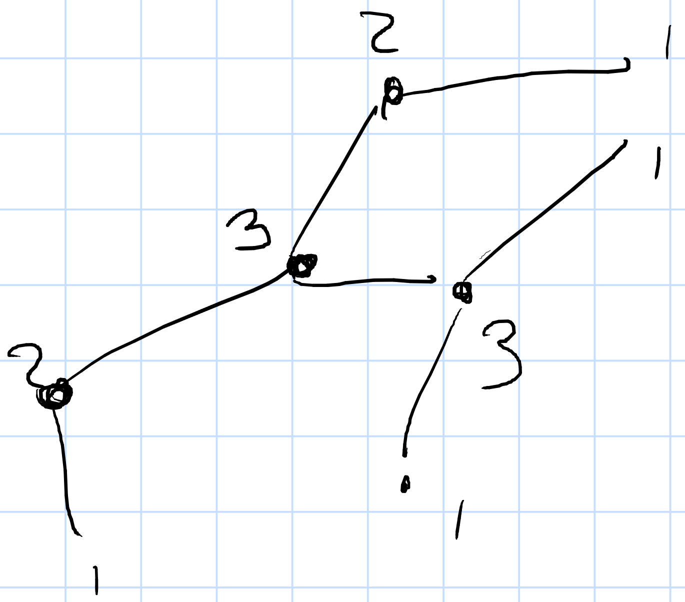


BIPARTIDO COMPLETO



G É LOCALMENTE IRREGULAR

CONJECTURA: 3 CORES



CONJ.: $\chi'_{IRR}(G) \leq 3$

$\shortparallel$

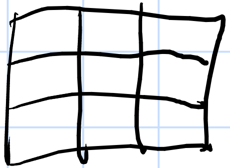
MENOR # CORES EM UMA

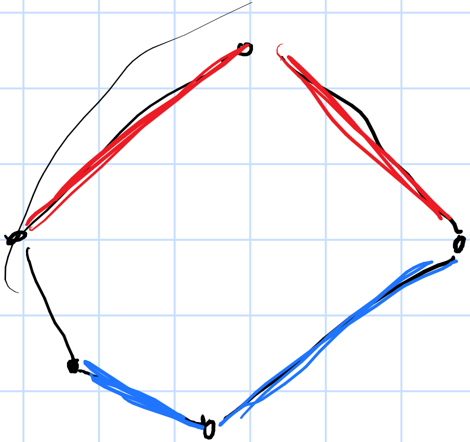
COLORAÇÃO LOC. IRREG

$c \leq 3$

$f : E(G) \to [1, \ldots, c]$

G_1



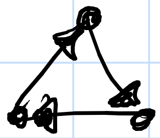


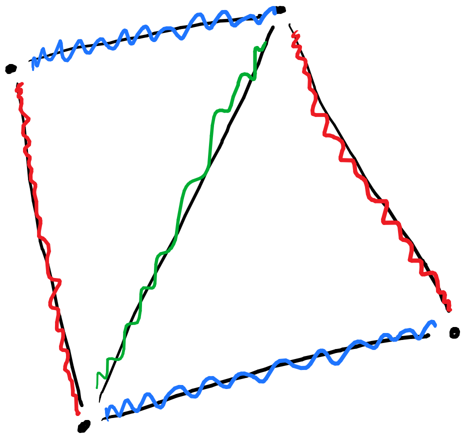
2×1

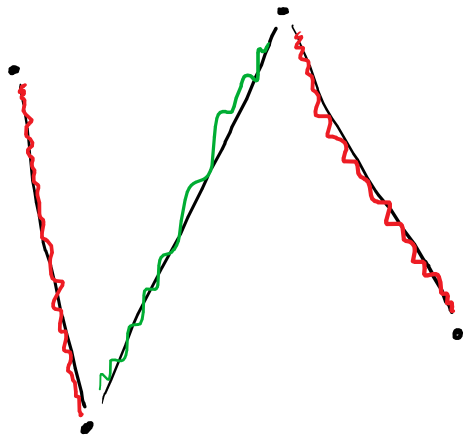
$$D(G, C_3^{\circlearrowright}) \leq 2^{\lfloor \frac{n^2}{4} \rfloor}$$

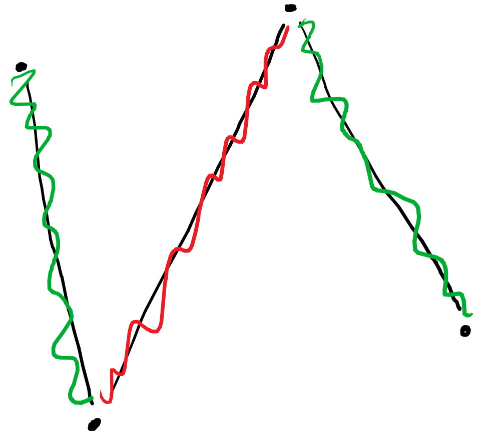
n É Nº DE VÉRTICES DE G

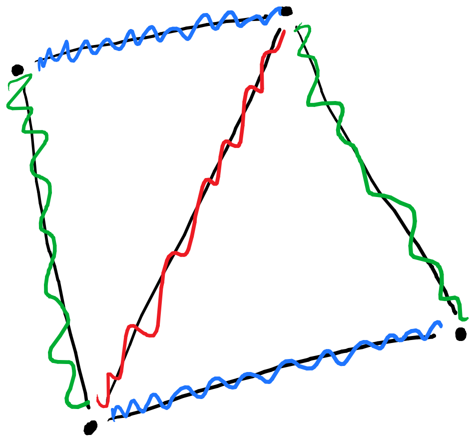
$$D(G, C_3^{\circlearrowright}) = 2^{\lfloor \frac{n^2}{4} \rfloor} \iff G = K_{\lfloor \frac{n}{2} \rfloor, \lceil \frac{n}{2} \rceil}$$

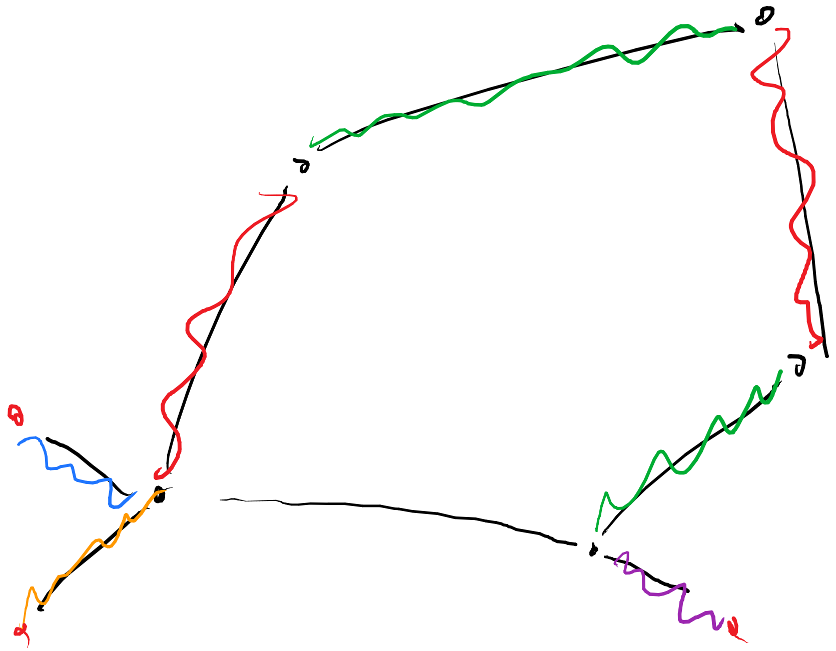










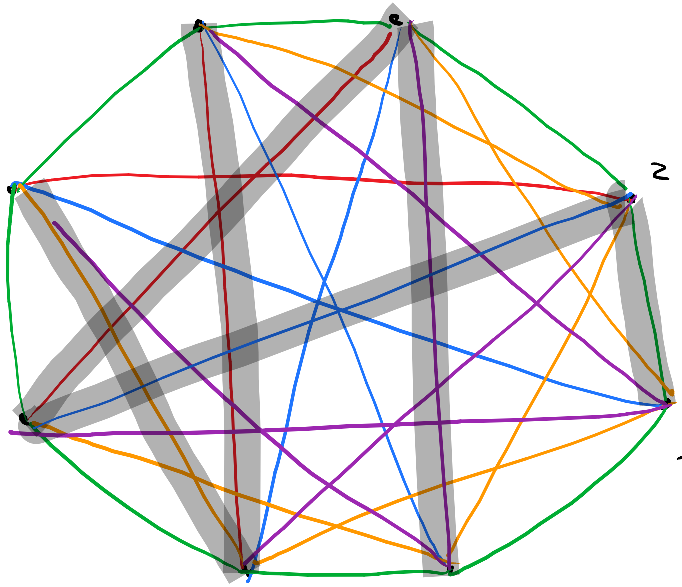


$n - K - 1$

0 5 7 3 2 6 1 4
5 2 4 1 4 5 3

6 6

K=6 : 6 | 6 5 4 3 2 1
K=5 : 5, 4 | 5 4 3 2 1
K=4 : 4, 3, 2 | 4, 3, 2, 1



K = 5

4

4 0 5 1 6 2 7 3

K = 6

K = 4

12 - 7 + 1

2K - n + 1
8 - 7 + 1 = 2

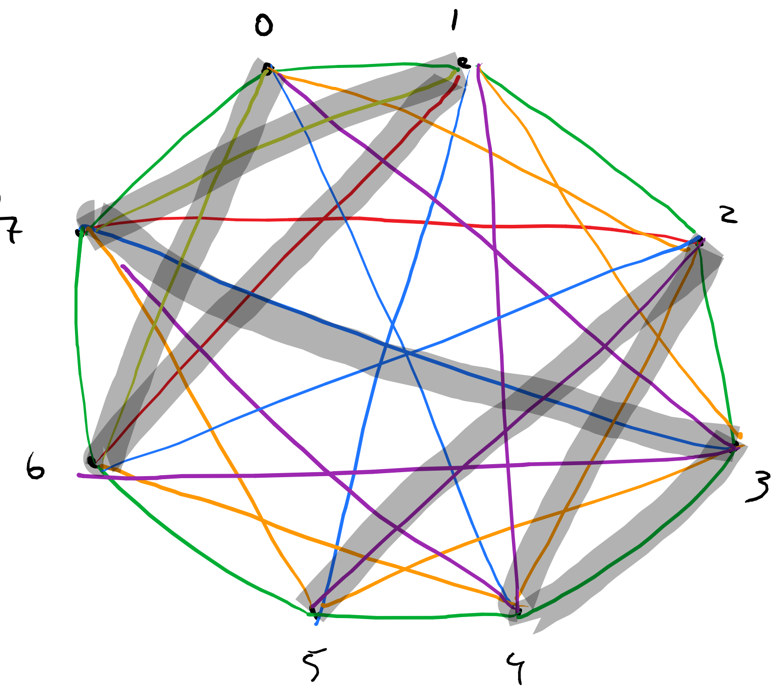
6

$n - k - 1$

0 5 7 3 2 6 1 4
5 2 4 1 4 5 3

6 6

K=6 : 6 | 6 5 4 3 2 1
K=5 : 5,4 | 5 4 3 2 1
K=4 : 4, 3, 2 | 4, 3, 2, 1



6 1 4 6
0 6 5 1 7

0 1 5 6 7
1 4 1 1

5

0 6 1 7 3 2 4
6 5 6 4 1 2

3

0 3 4 2 5 1 6 9
3 1 2 3 4 5 3

06 71

0 6 1 7 3 4 2 5
6 5 6 4 1 2 3

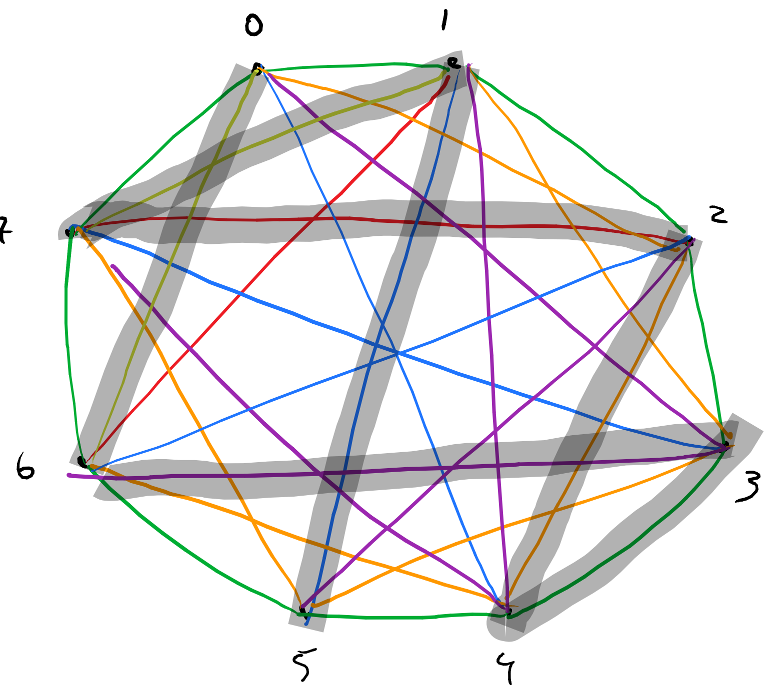
0 1

$n - k - 1$

0 5 7 3 2 6 1 4
5 2 4 1 4 5 3

6 6

K=6 : 6 | 6 5 4 3 2 1
K=5 : 5,4 | 5 4 3 2 1
K=4 : 4,3,2 | 4,3,2,1



6 1 4 6
0 6 5 1 7

0 1 5 6 7
1 4 1 1

0 6 3 4 2 7 1 5
6 3 1 2 5 6 4

5
0 6 1 7 3 2 4
6 5 6 4 1 2
3

0 3 4 2 5 1 6 9
3 1 2 3 4 5 3

06 71

0 6 1 7 3 4 2 5
6 5 6 4 1 2 3

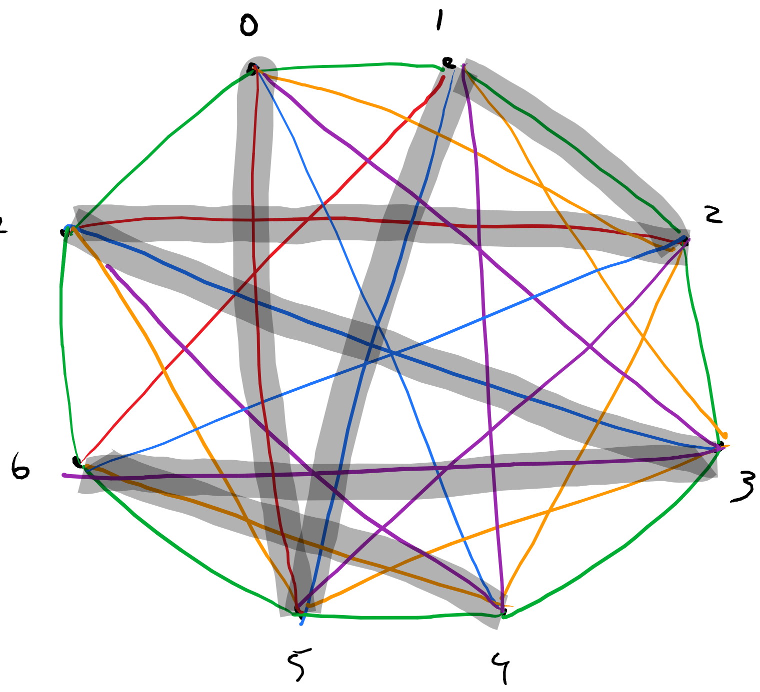
0 1

n − k − 1

0 5 7 3 2 6 1 4
5 2 4 1 4 5 3

6 6

k = 6 : 6 | 6 5 4 3 2 1
k = 5 : 5, 4 | 5 4 3 2 1
k = 4 : 4, 3, 2 | 4, 3, 2, 1



6 1 4 6
0 6 5 1 7

0 1 5 6 7
1 4 1 1

0 6 3 4 2 7 1 5
6 3 1 2 5 6 4

5

0 6 1 7 3 2 4
6 5 6 4 1 2

3

0 3 4 2 5 1 6 9
3 1 2 3 4 5 3

0 6 7 1

0 6 1 7 3 4 2 5
6 5 6 4 1 2 3

0 5

0 1

0 4

0 5 1 2 7 3 6 4
5 4 1 5 4 3 2

n - k - 1

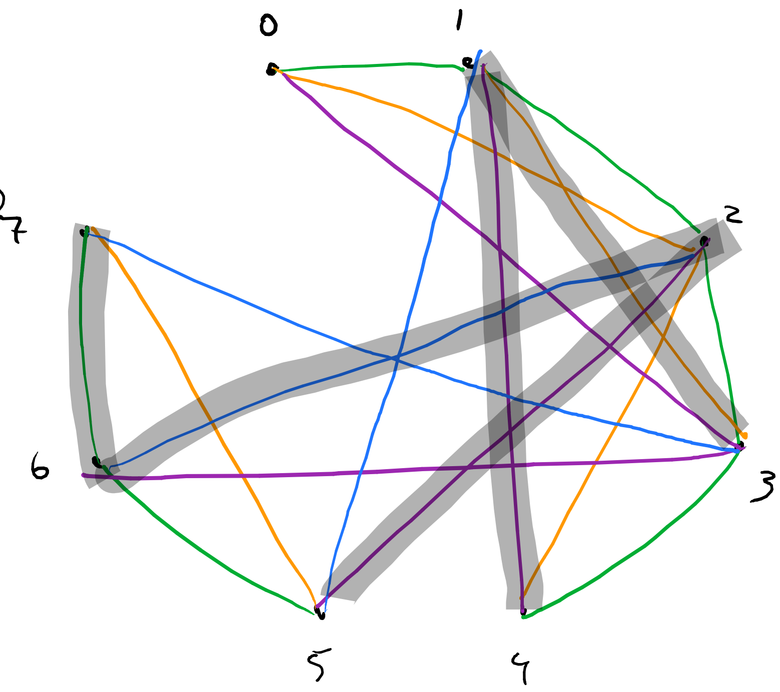
0 5 7 3 2 6 1 4
5 2 4 1 4 5 3

6 6

K=6 : 6 | 6 5 4 3 2 1
K=5 : 5,4 | 5 4 3 2 1
K=4 : 4, 3, 2 | 4, 3, 2, 1

6 1 4 6
0 6 5 1 7

0 1 5 6 7
1 4 1 1



5

0 6 1 7 3 2 4
6 5 6 4 1 2

3

0 3 4 2 5 1 6 9
3 1 2 3 4 5 3

0 6 7 1

0 6 1 7 3 4 2 5
6 5 6 4 1 2 3

0 5

0 1

0 4

0 6 4 2 7 1 5
6 3 1 2 5 6 4

0 5 1 2 7 3 6 4
5 4 1 5 4 3 2

0 4 1 3 5 2 6 7
4 3 2 2 3 4 1

5 4 4 5

$$k = \frac{n}{2} \qquad n - n + 1$$

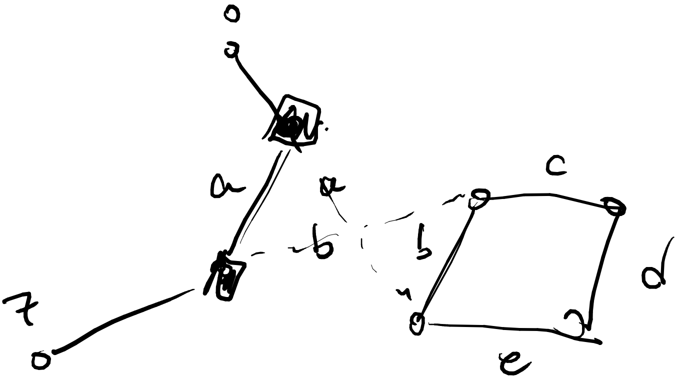
$$2k - n + 1$$

$$k = n - 1$$

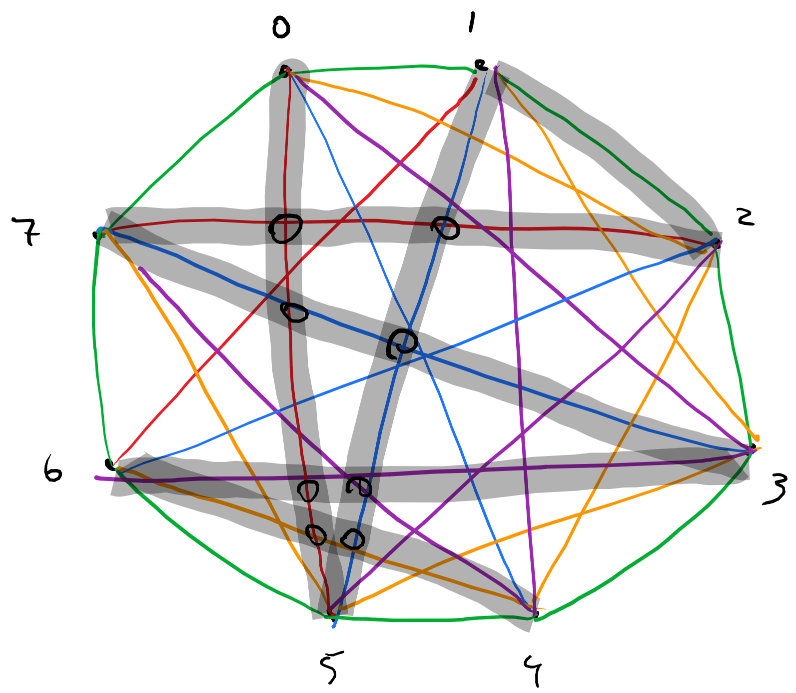
$$2(n-1) - n + 1$$

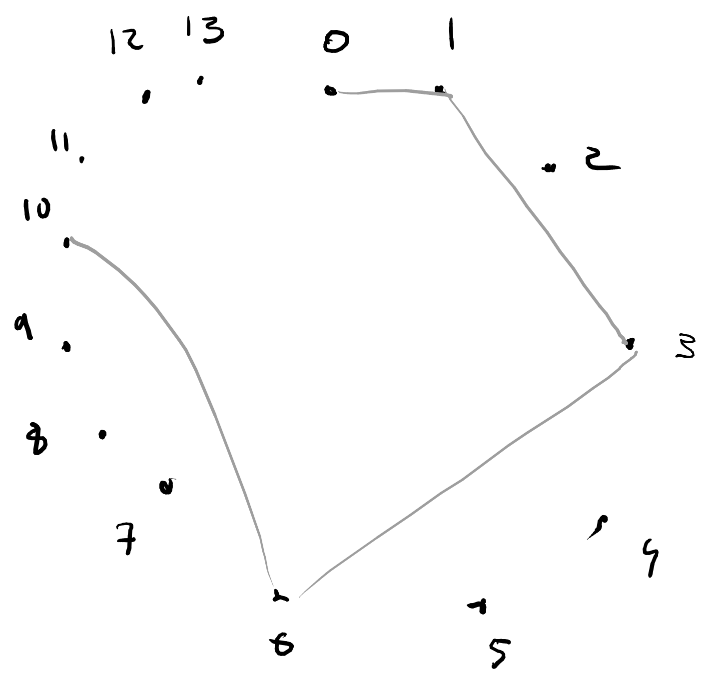
$$2n - 2 - n + 1$$

$$n - 1$$



1 3 2 4 3 2 4





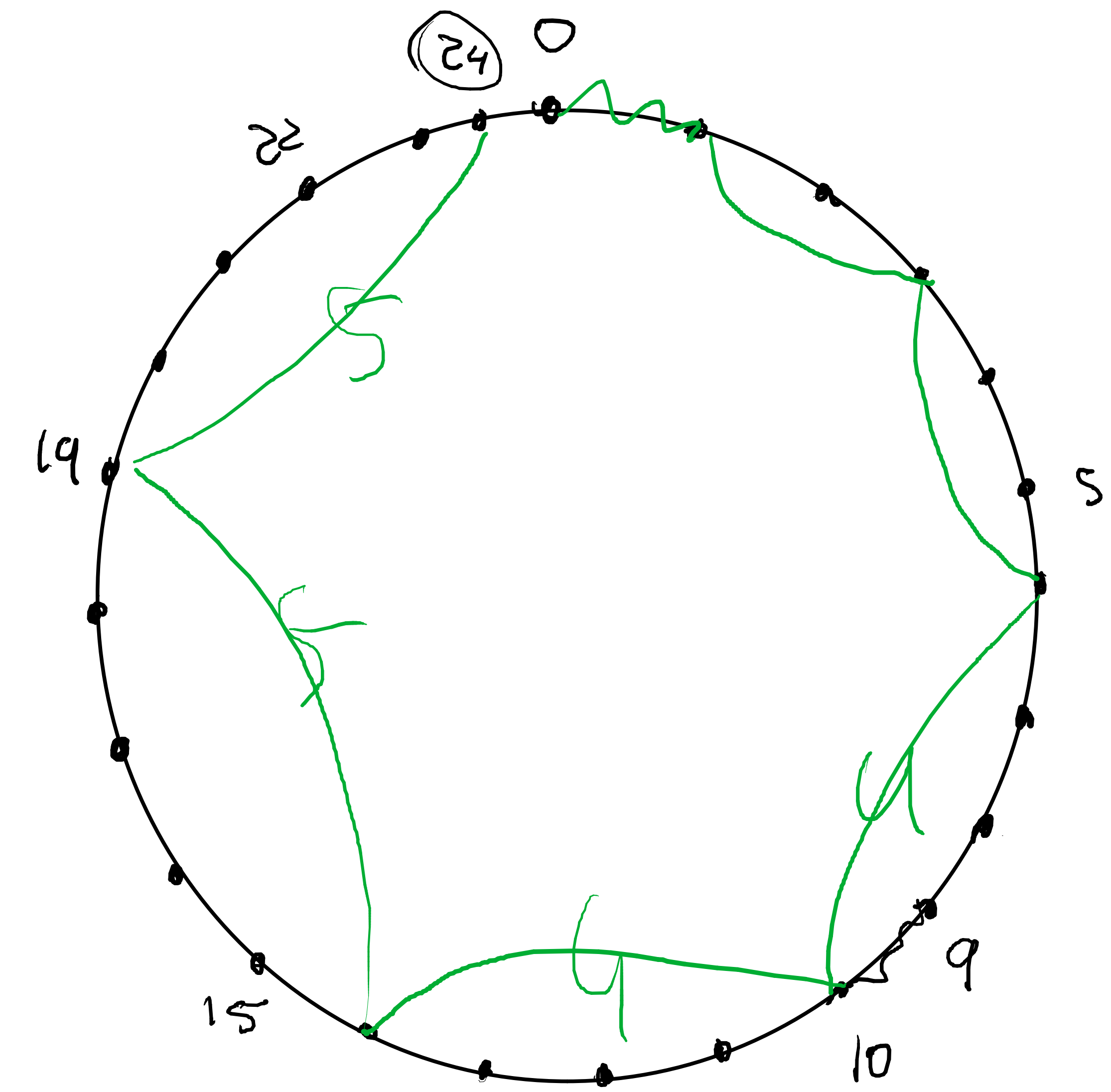
0 5 1 2 7 3 6 4

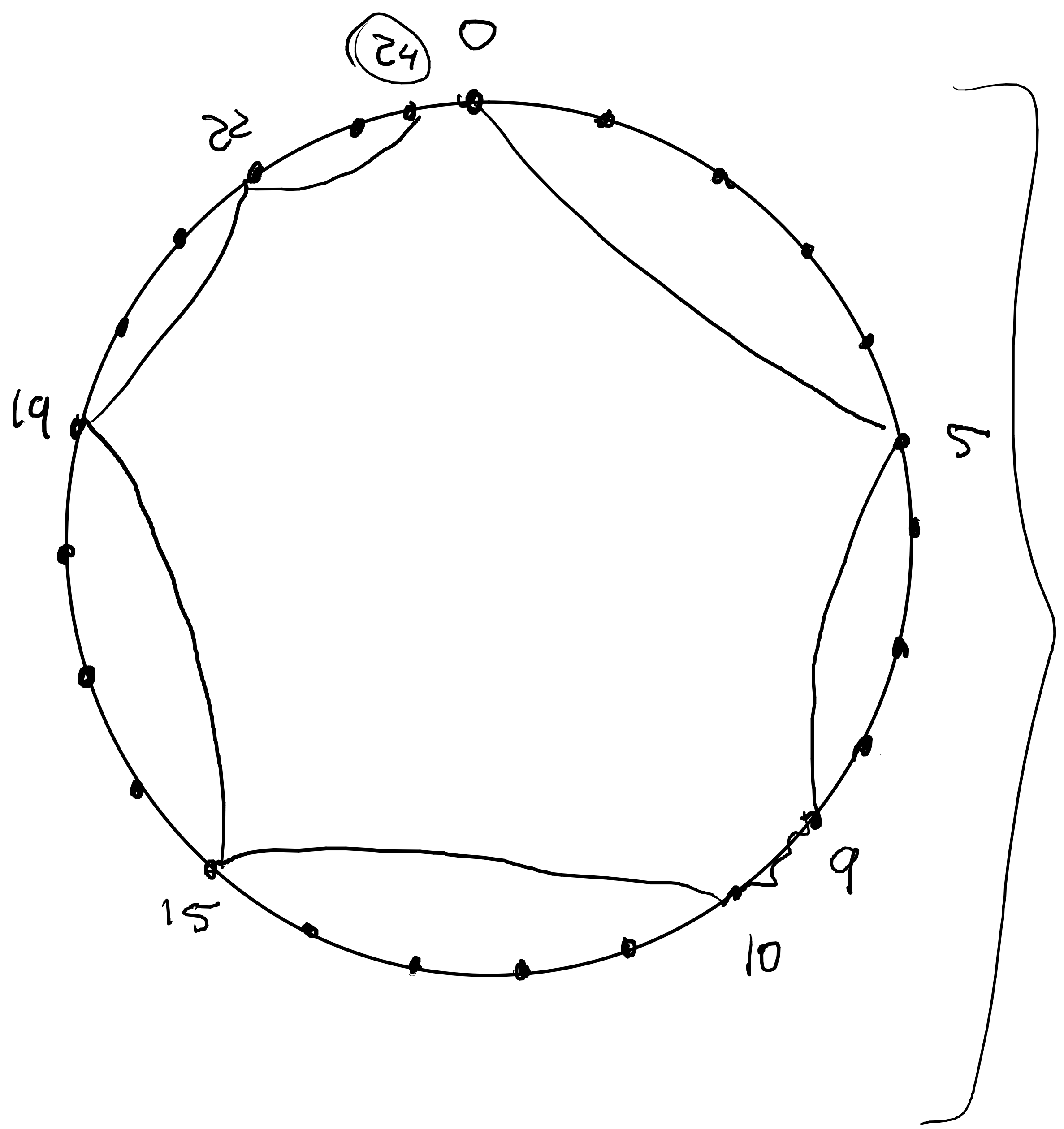
5 4 1 5 4 3 2 ~ }

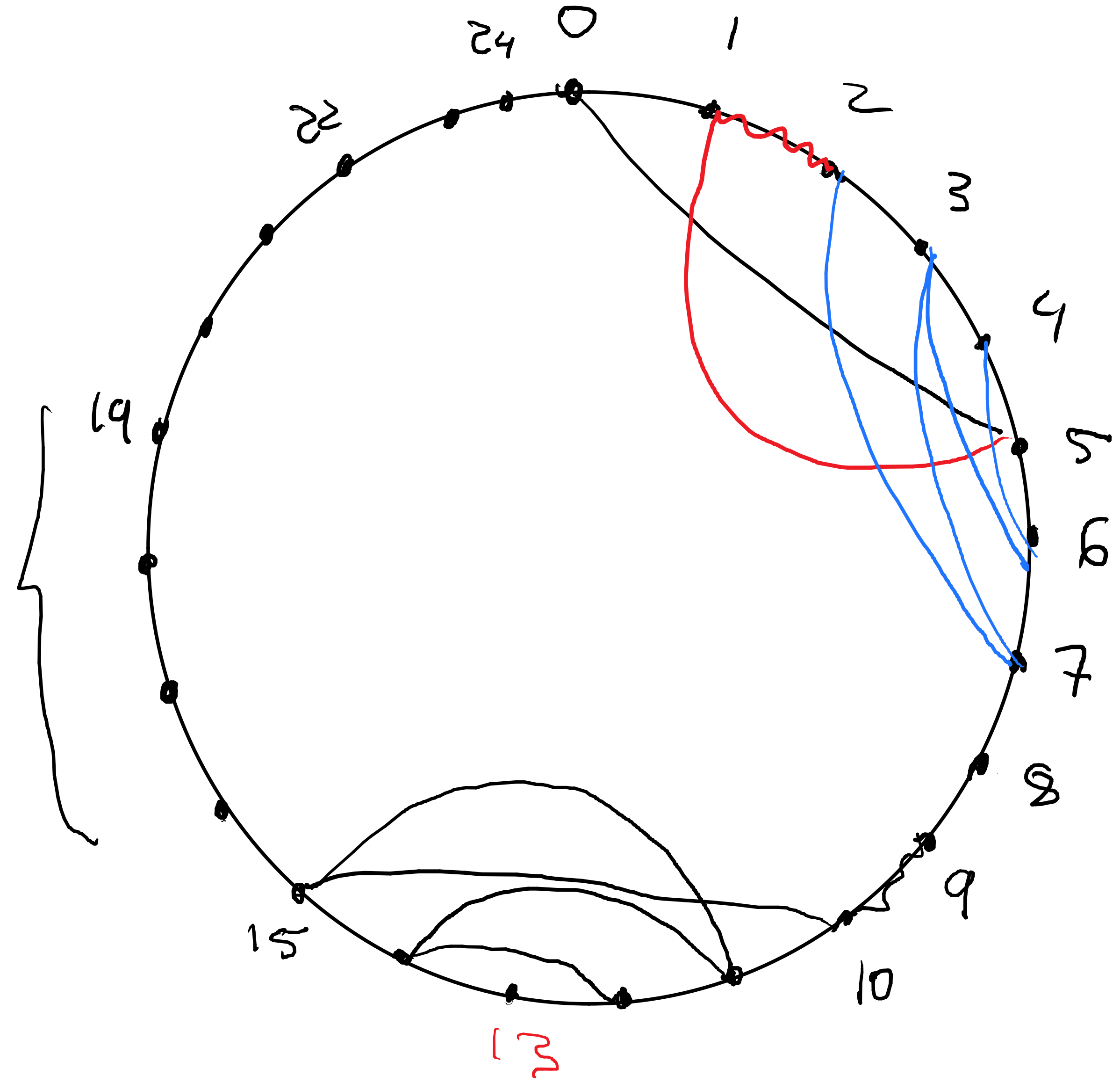
0 5 9 10 15 19 22 24

$0 + 1 + 2 + 3 + 4 + 4 + 5 + 5 = 24$

05127364







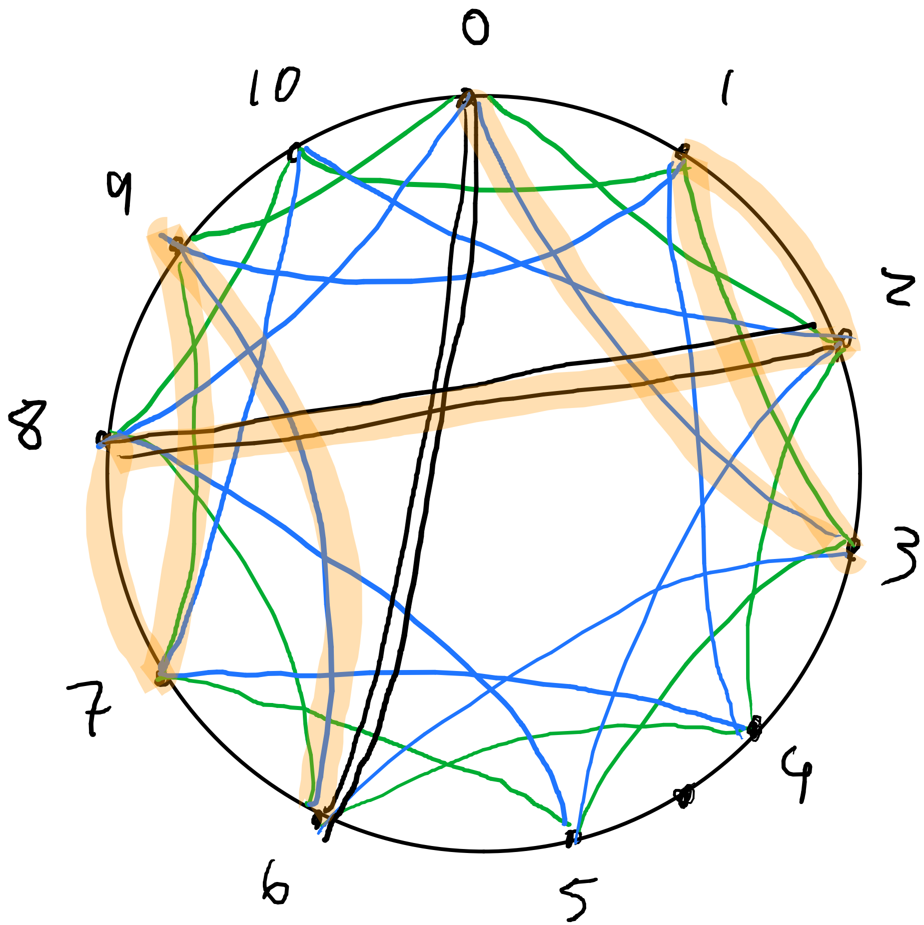
$\frac{n}{2} \leq k \leq n$

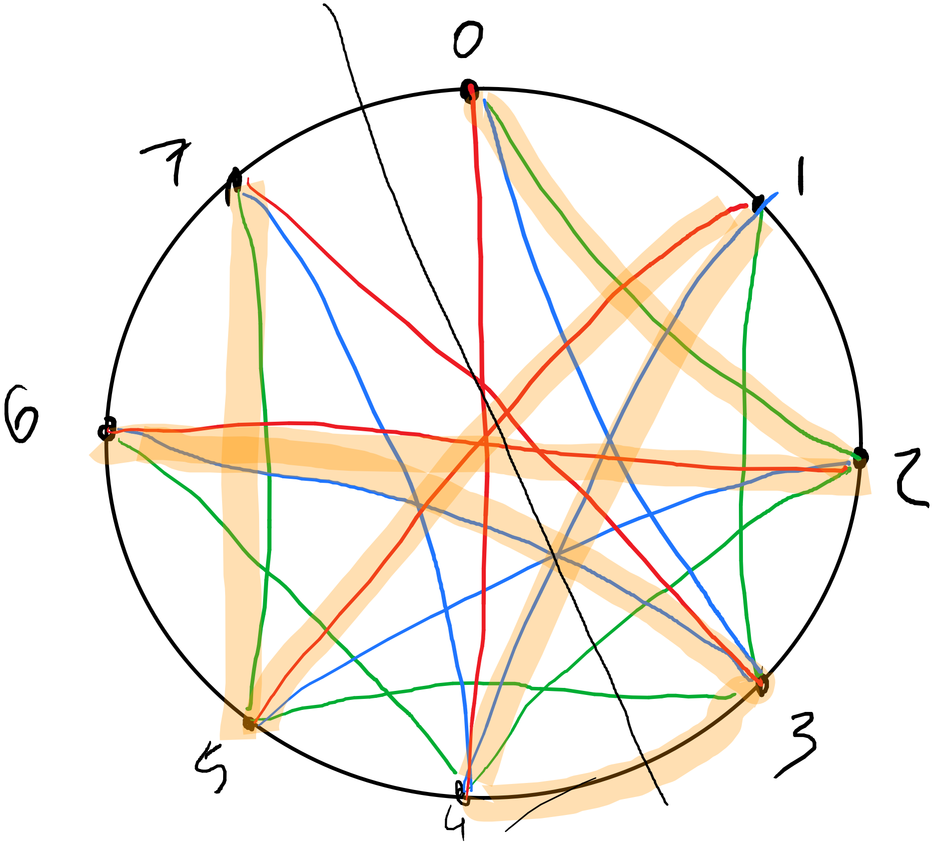
REPETIDOS : $2k - n + 1 \quad \cdots \quad k$

EX: $k=5 \quad n=7 \qquad 4, 5$

$k=6 \quad n=7 \qquad 6$

$k=4 \quad n=7 \qquad 2 \ \ldots \ 4$





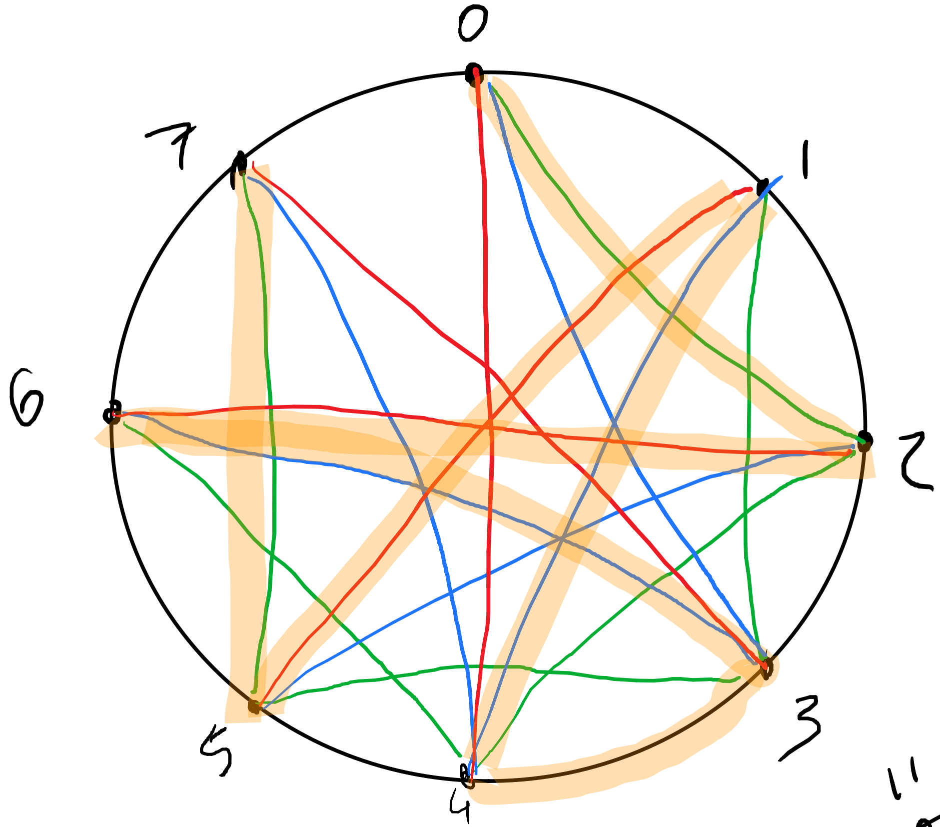
x_0

$7 \ x_1 \ x_2 \ \cdots \ x_7$

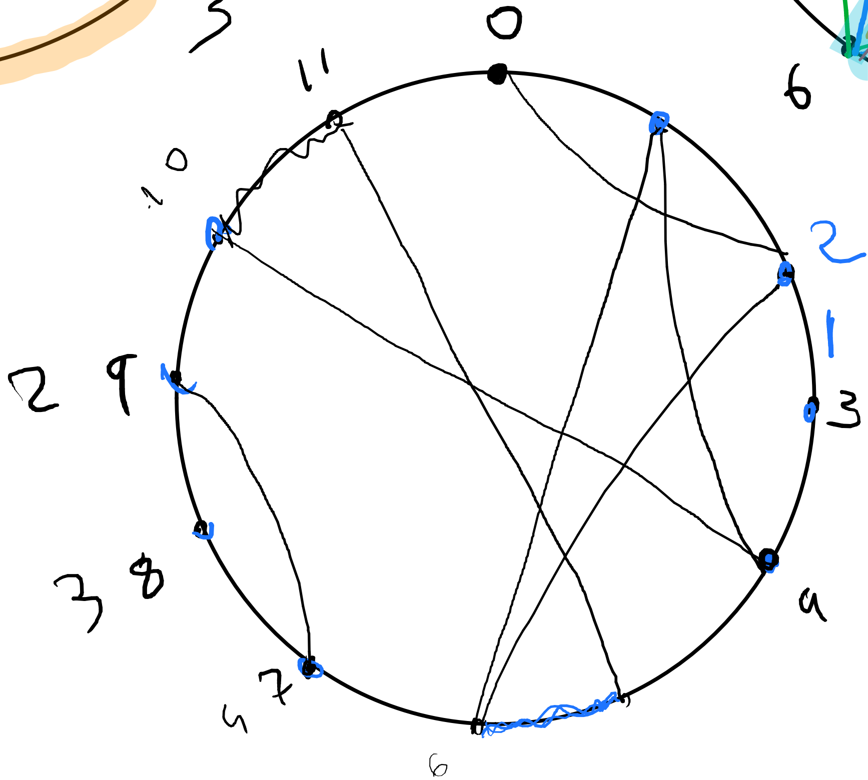
$0 \ 7-x_1 \ 7-x_2 \ \cdots \ 7-x_7$

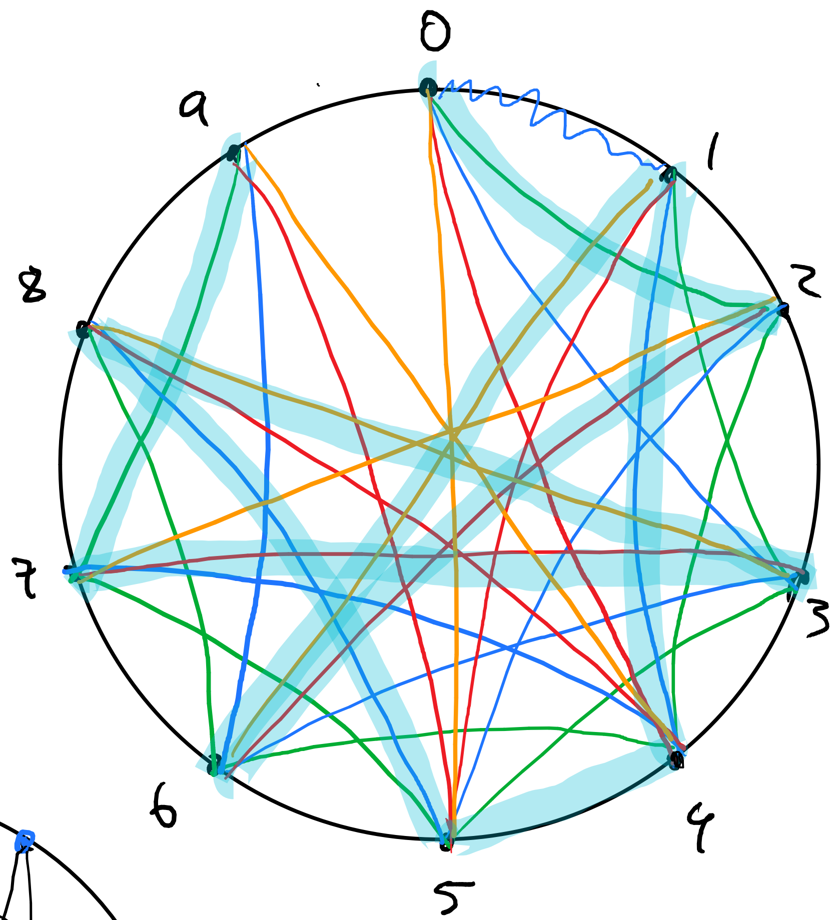
H-DECOMP. $\quad G$

$y_i = 7 - x_i \qquad D = \{H_1, \ldots, H_k\}$



0263
243





026145
2453

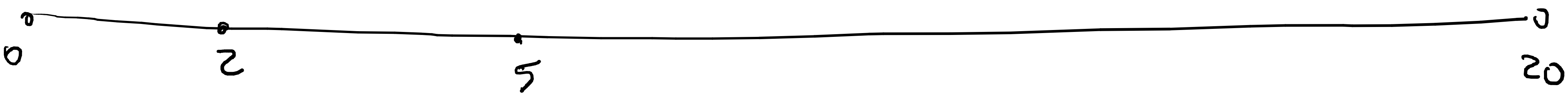
65

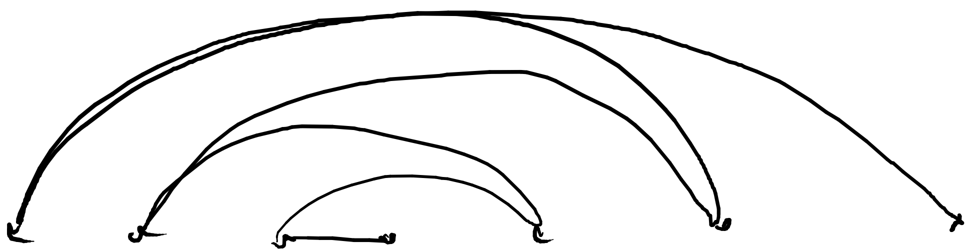
$n = 11 \qquad K = 6$

$1 + 2 \cdot \sum_{i=2}^{6} i \qquad 1 + 2 \cdot 20 = 41$

$2K - n + 1 = 2 \quad \dots \quad 6 = K$

$2 \quad 3 \quad 4 \quad 5 \quad 6$





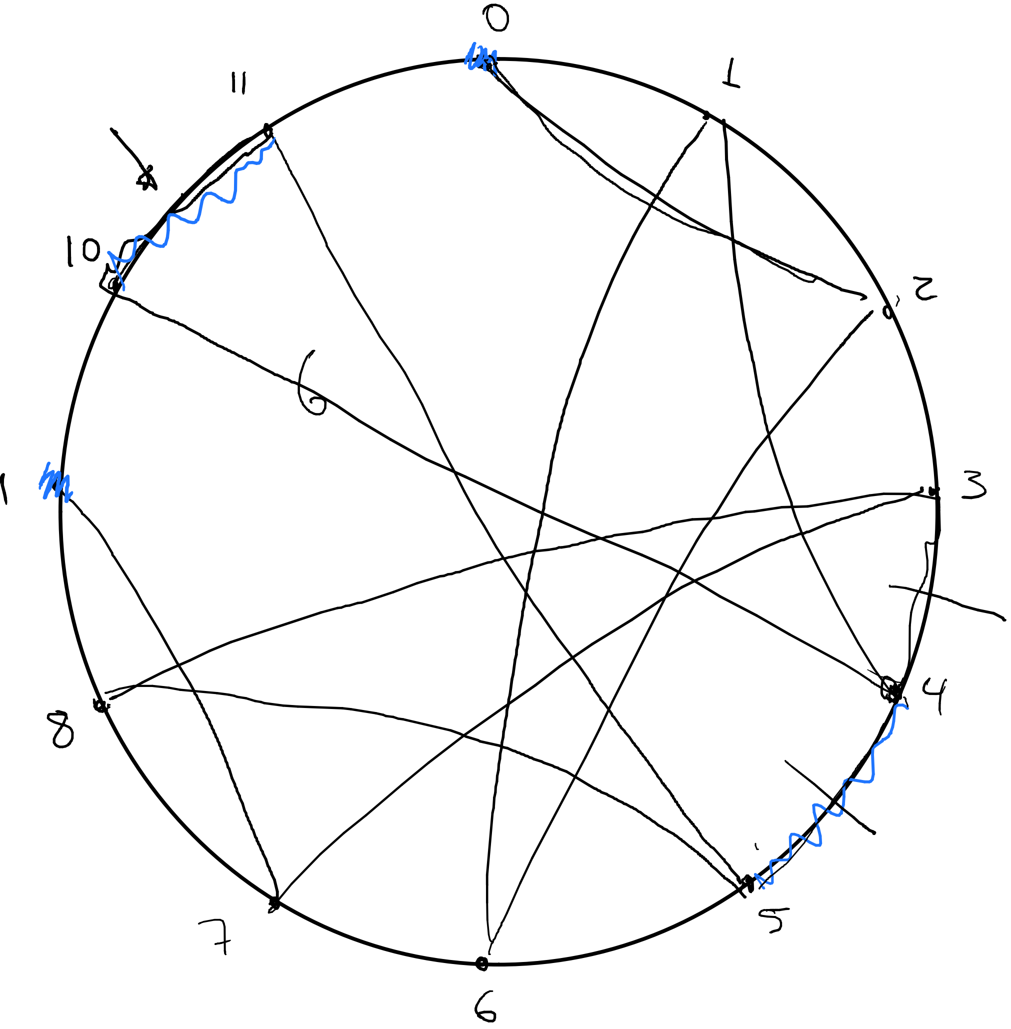
$n = 11$

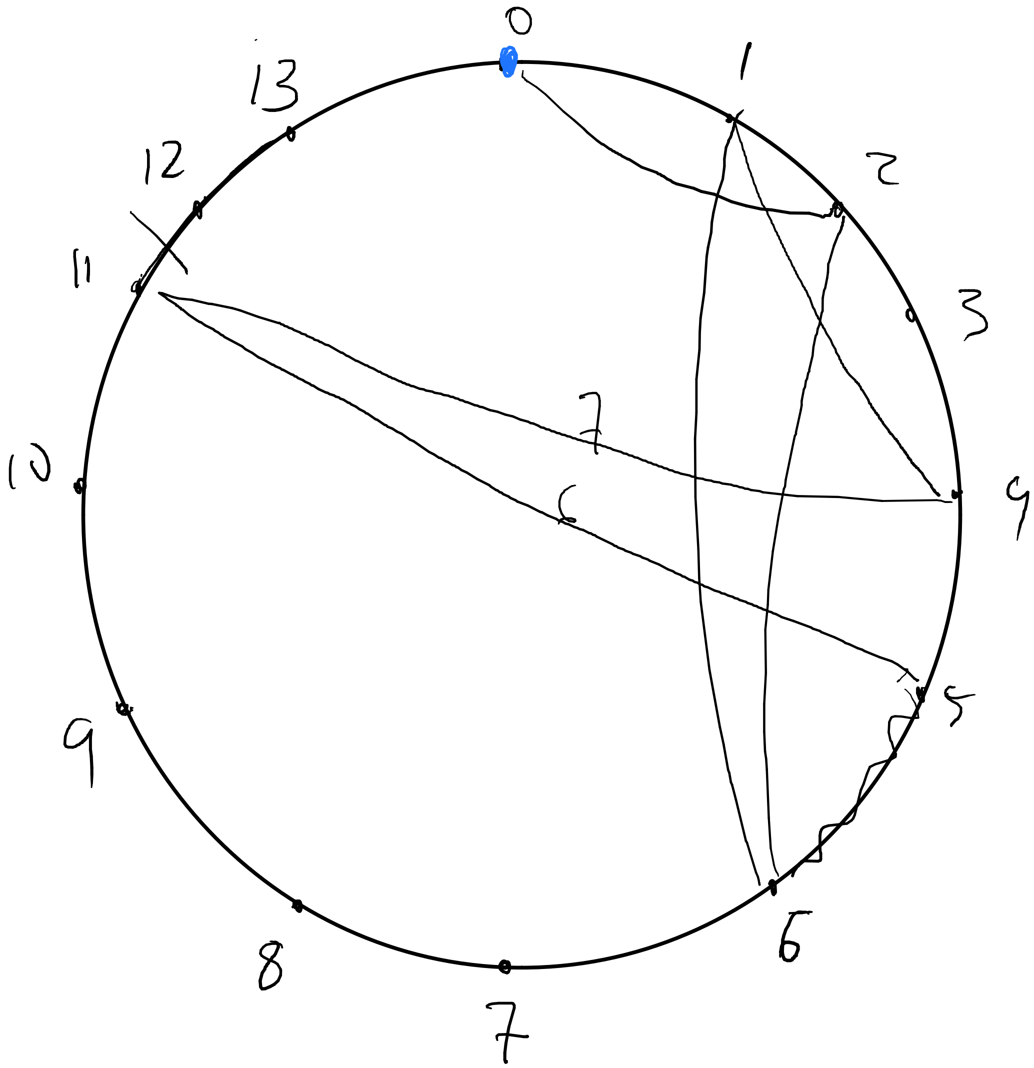
$K = 6$

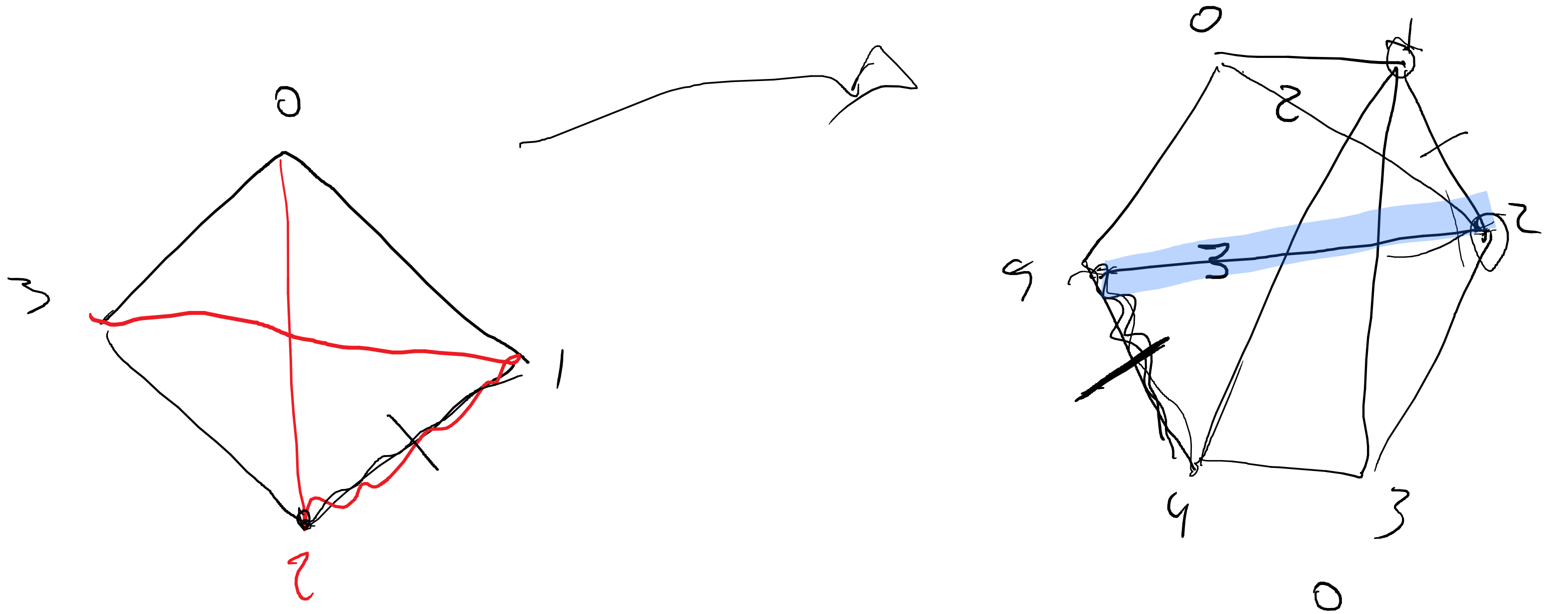
0 2 6 1 4 10 11

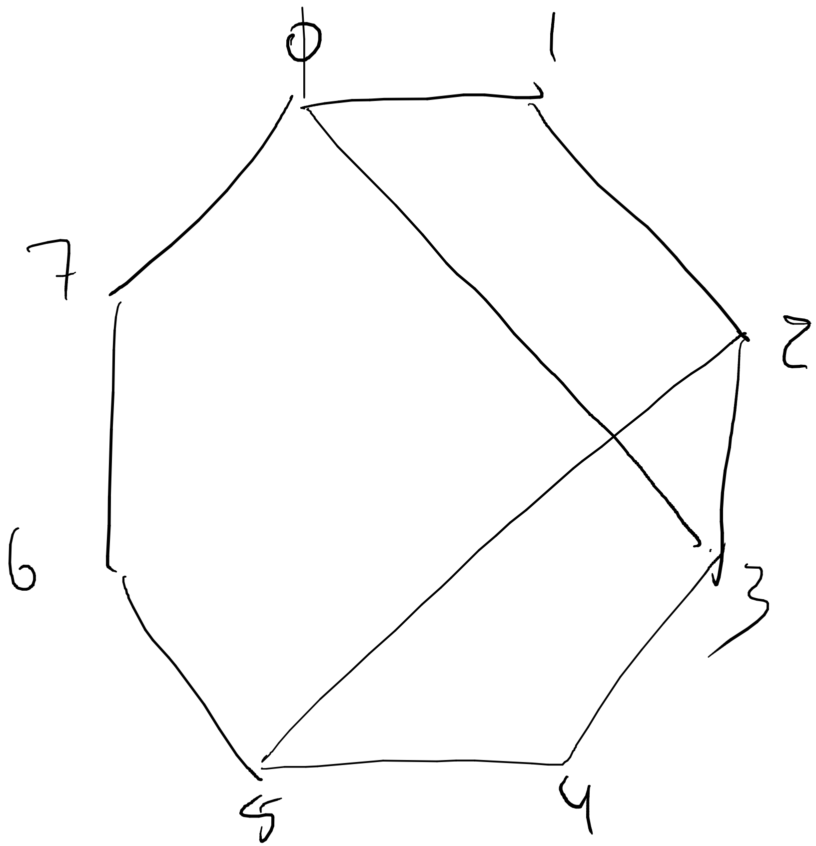
0 3 1 7 2 6 5 9 4 10 8 11

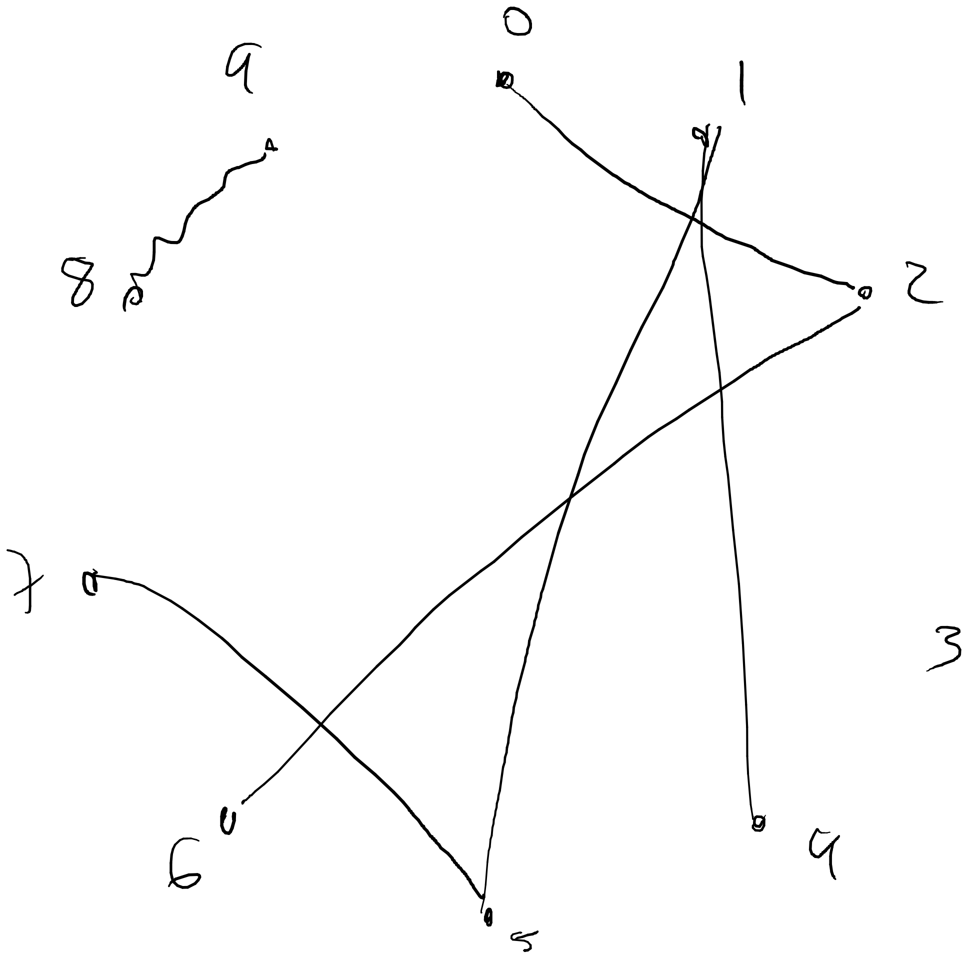
3 2 6 5 4 1 4 5 6 2 3

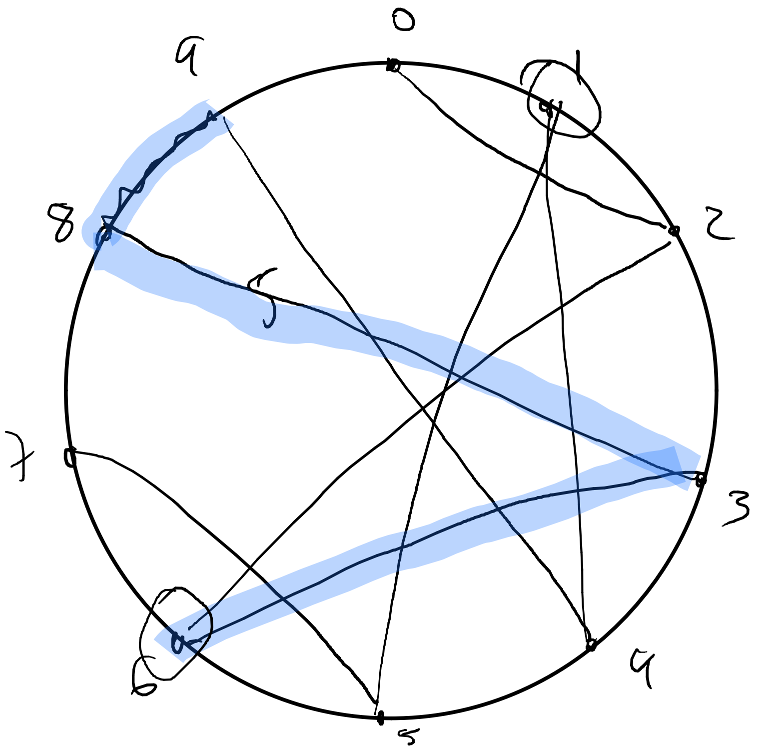


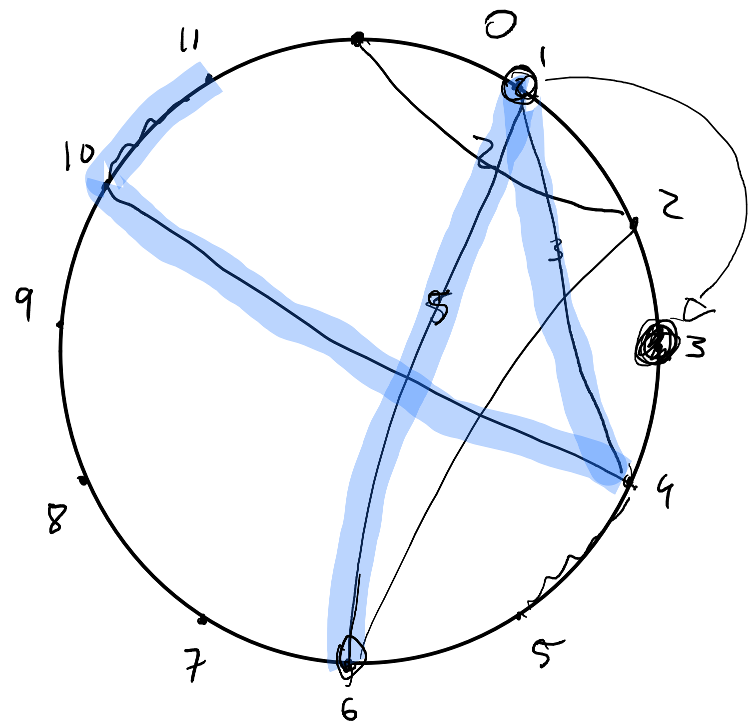



0
3
1
2
0
1
2
2
3
5
4
3


0
1
7
2
6
3
5
4

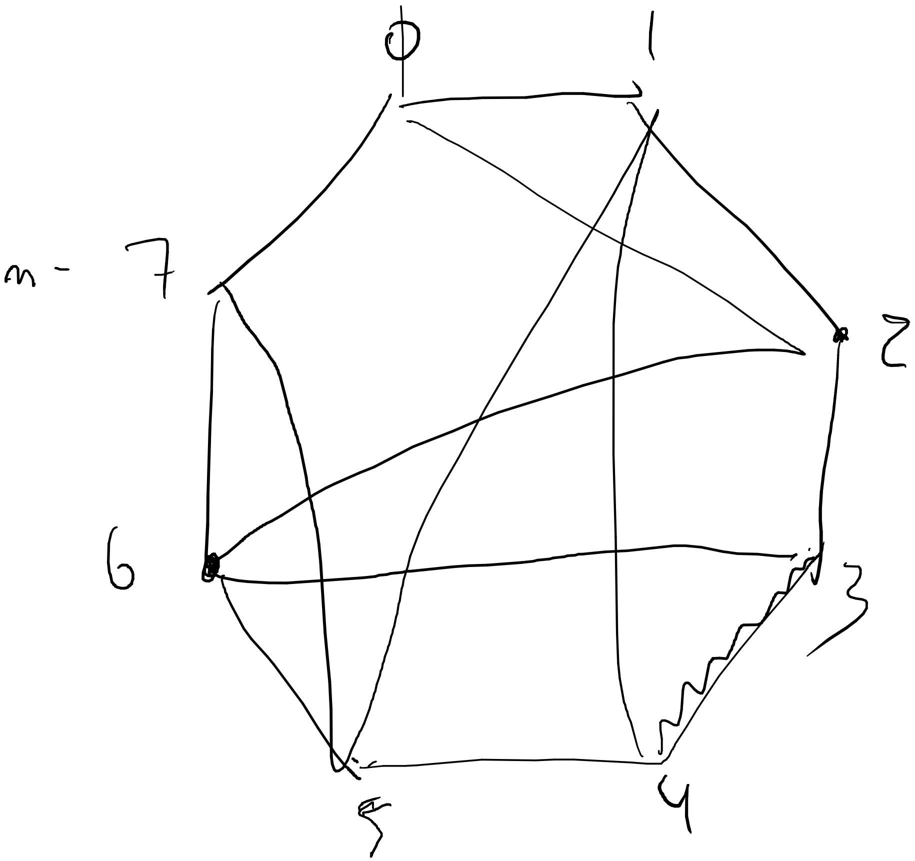

0
9
1
8
2
7
3
6
4
5

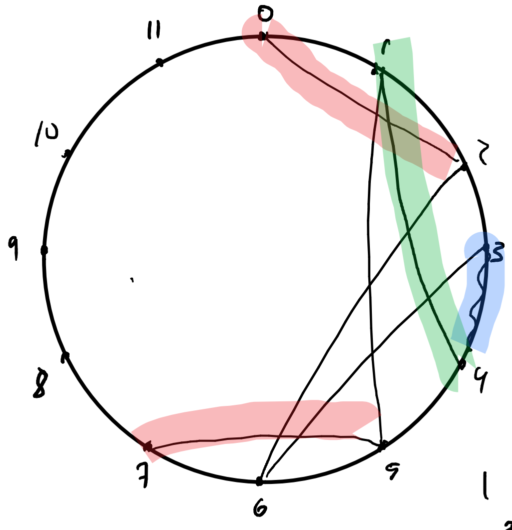


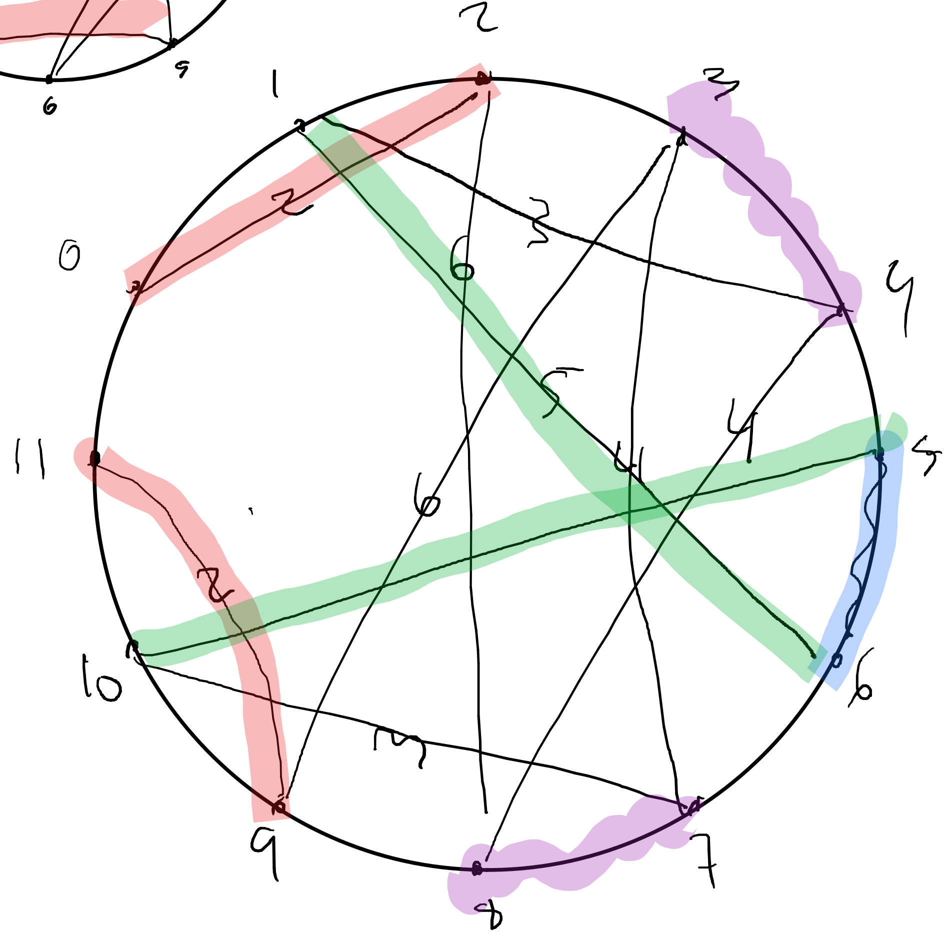


3 5 1

5 3 6 1

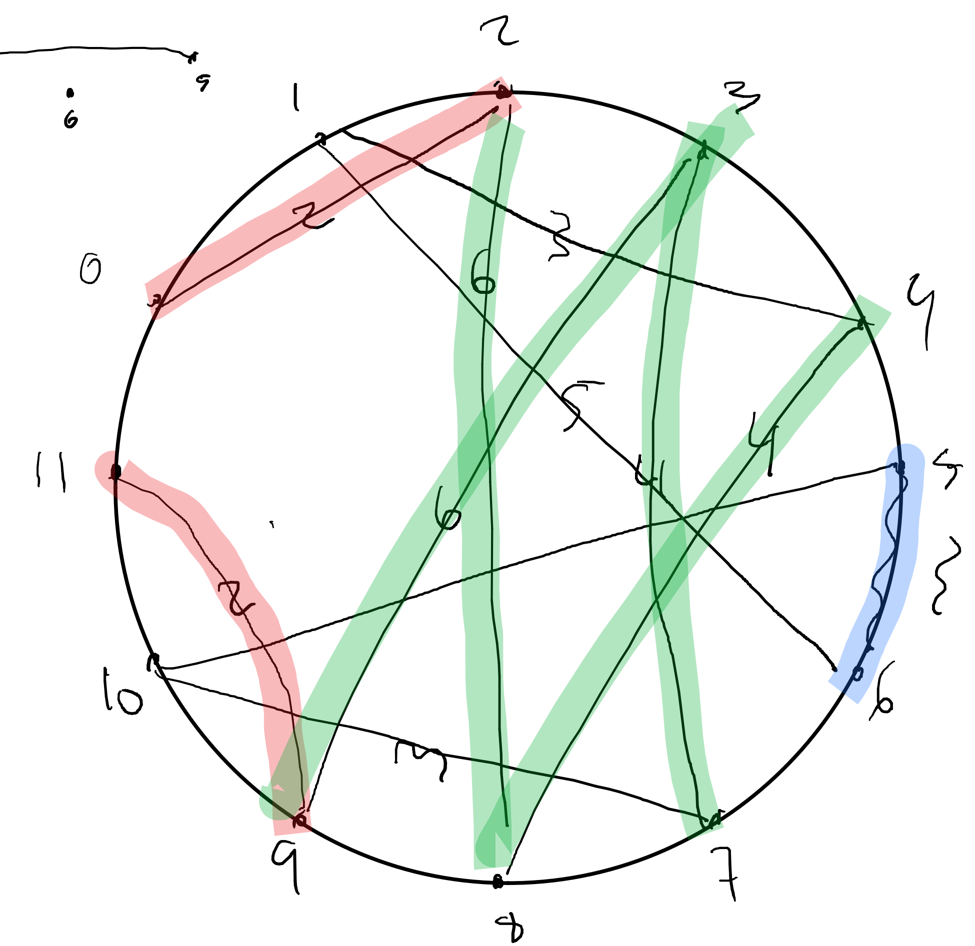

m - 7
0
1
2
3
4
5
6
7

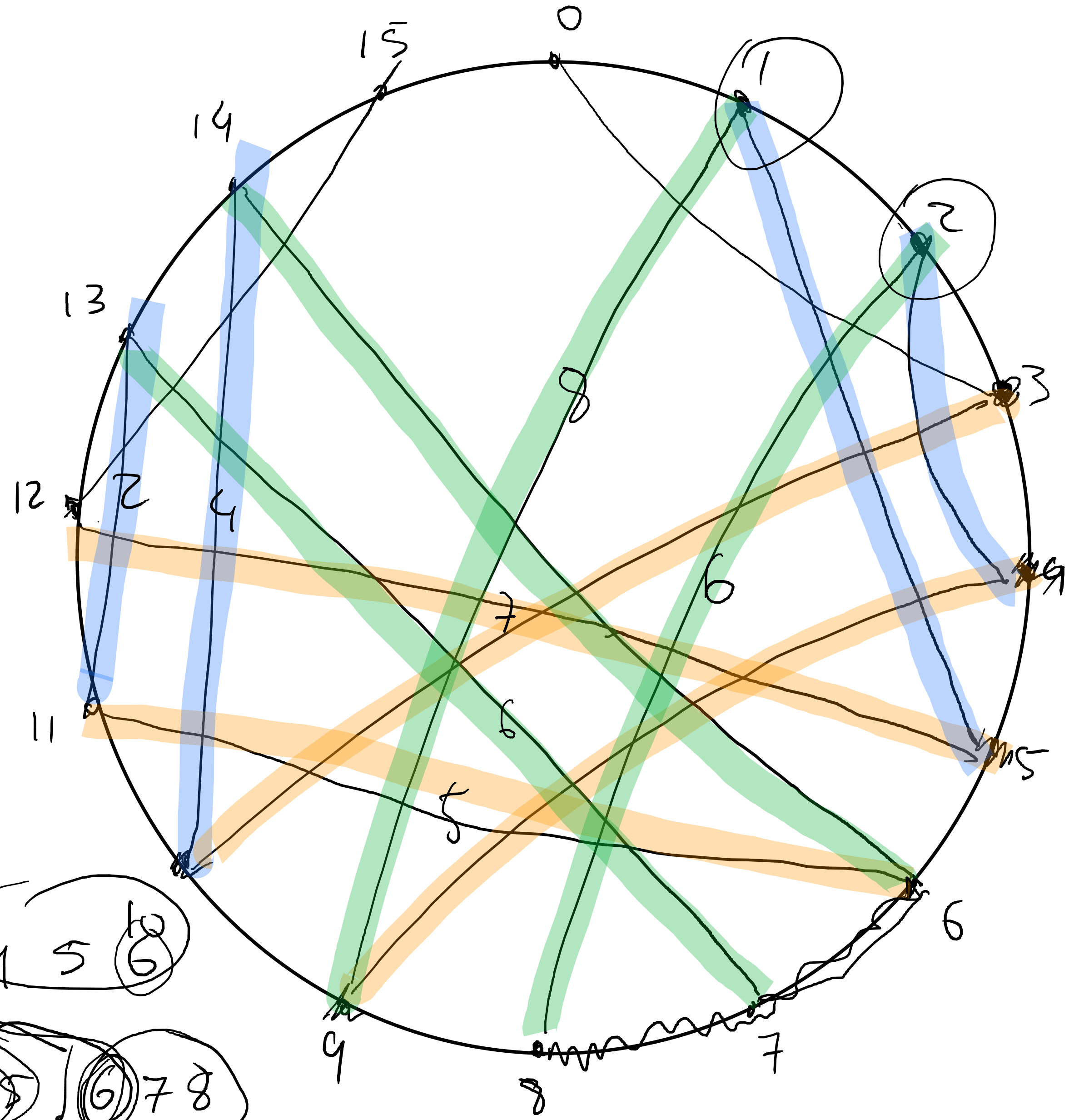

0
1
2
3
4
5
6
7
8
9
10
11


0
1
2
3
4
5
6
7
8
9
10
11
m

2 4   5 7   6 8

~~1~~ ~~2~~ 3 ~~4~~ 5 6 ~~7~~ ~~8~~



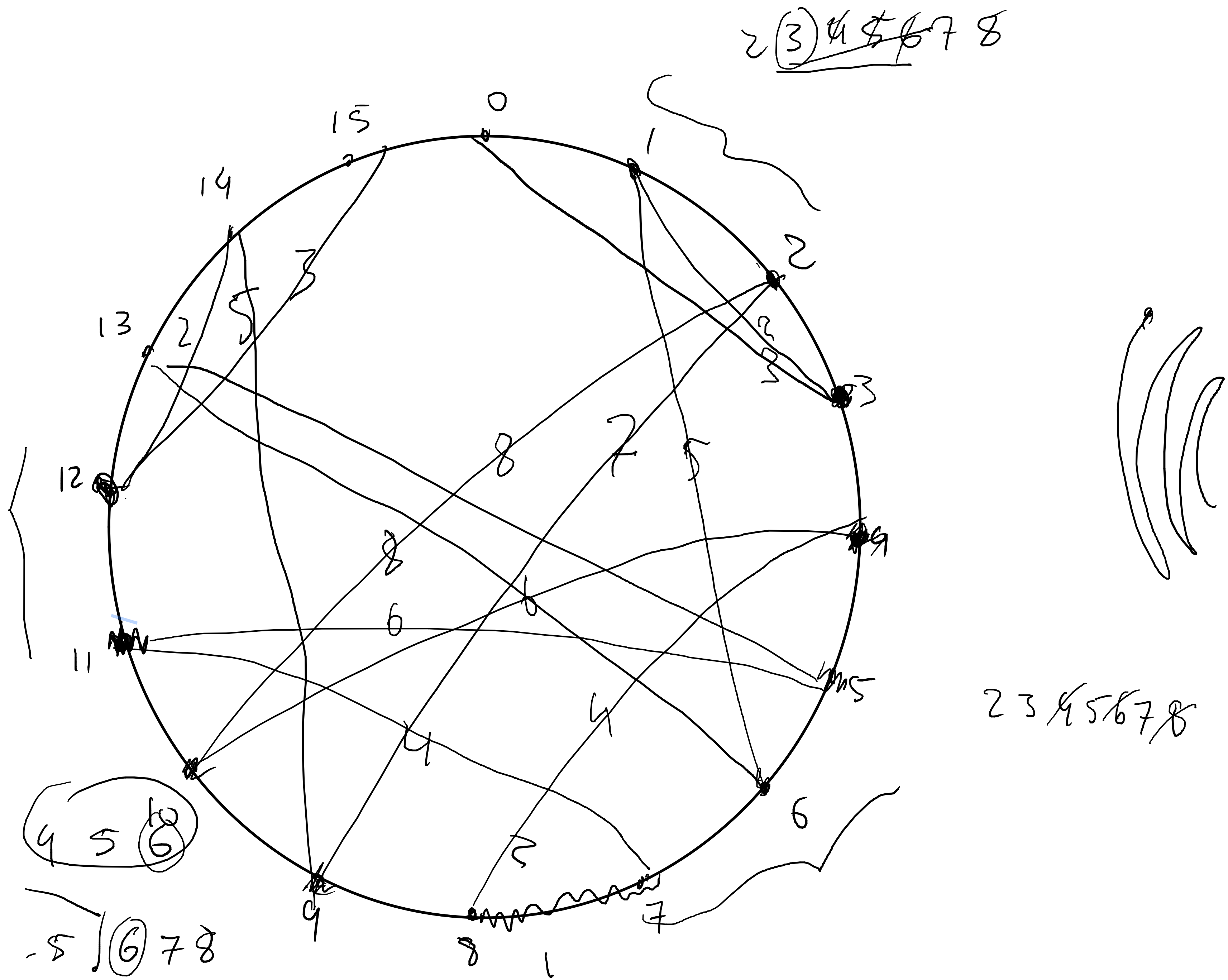


1 2 3 | 4 5 6

1 2 3 | 4 5 6

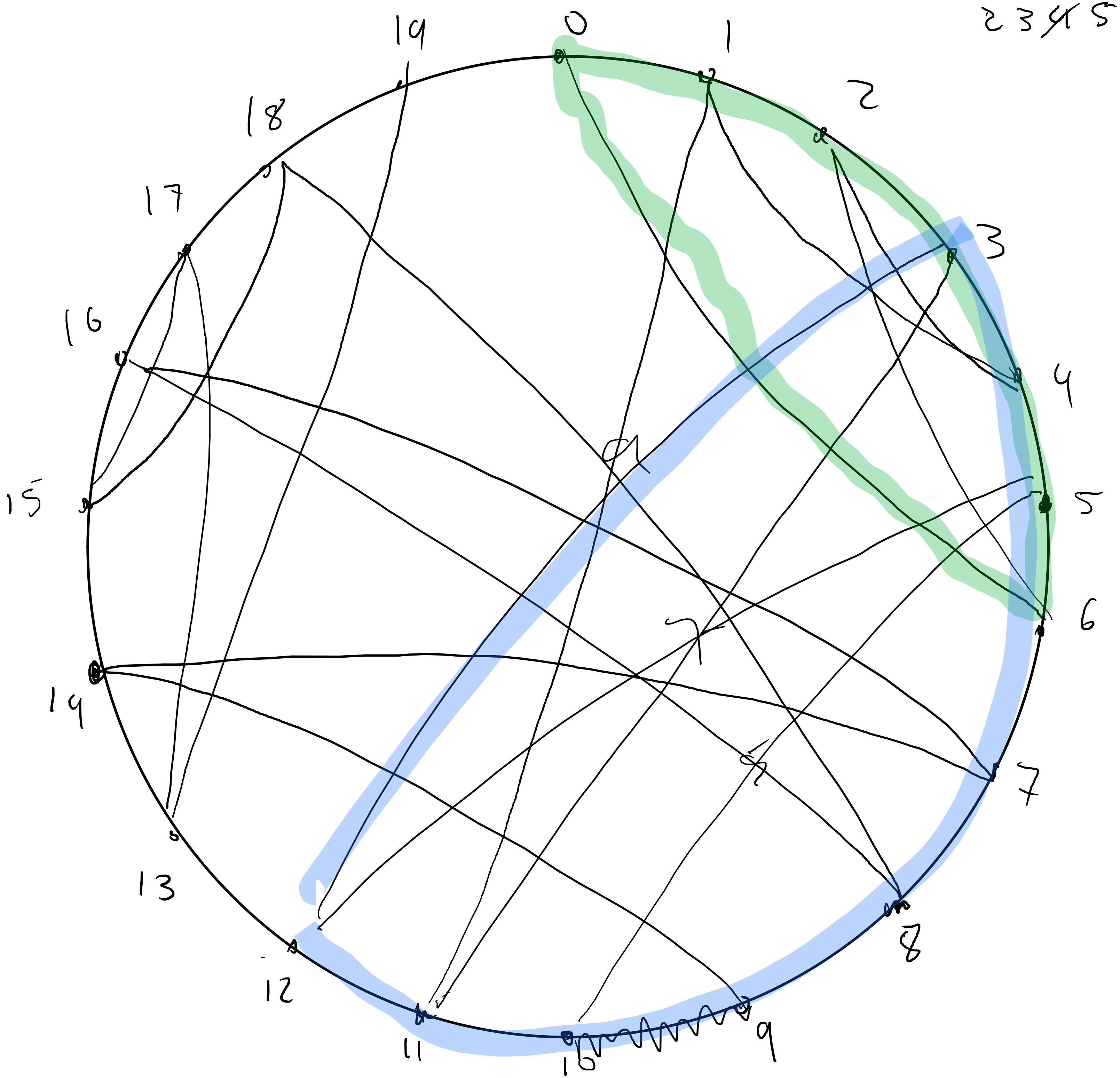
1 2 3 | 4 5 | 6 7 8

1 2 3 | 4 5 6



2 3 4 5 6 7 8
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
2 3 4 5 6 7 8
4 5 6
5 6 7 8

~~2 3 4 5 6 7 8 9 10~~



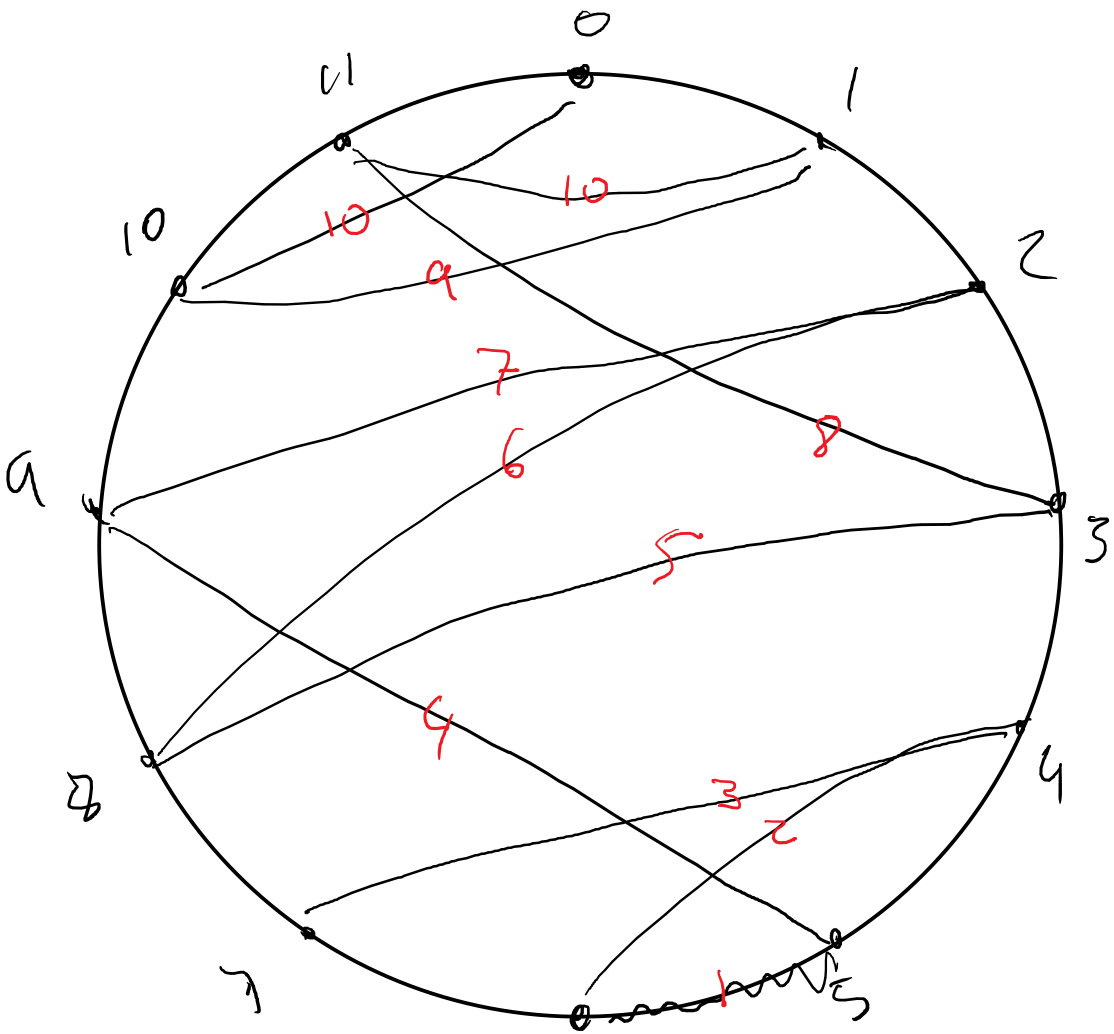
$n = 15$

$K = \frac{n+1}{2}$ 1 2 3 4 5 6 7 8

2 3 4 5 6 7 8

$K = \frac{n+3}{2}$ 1 2 3 4 5 6 7 8 9

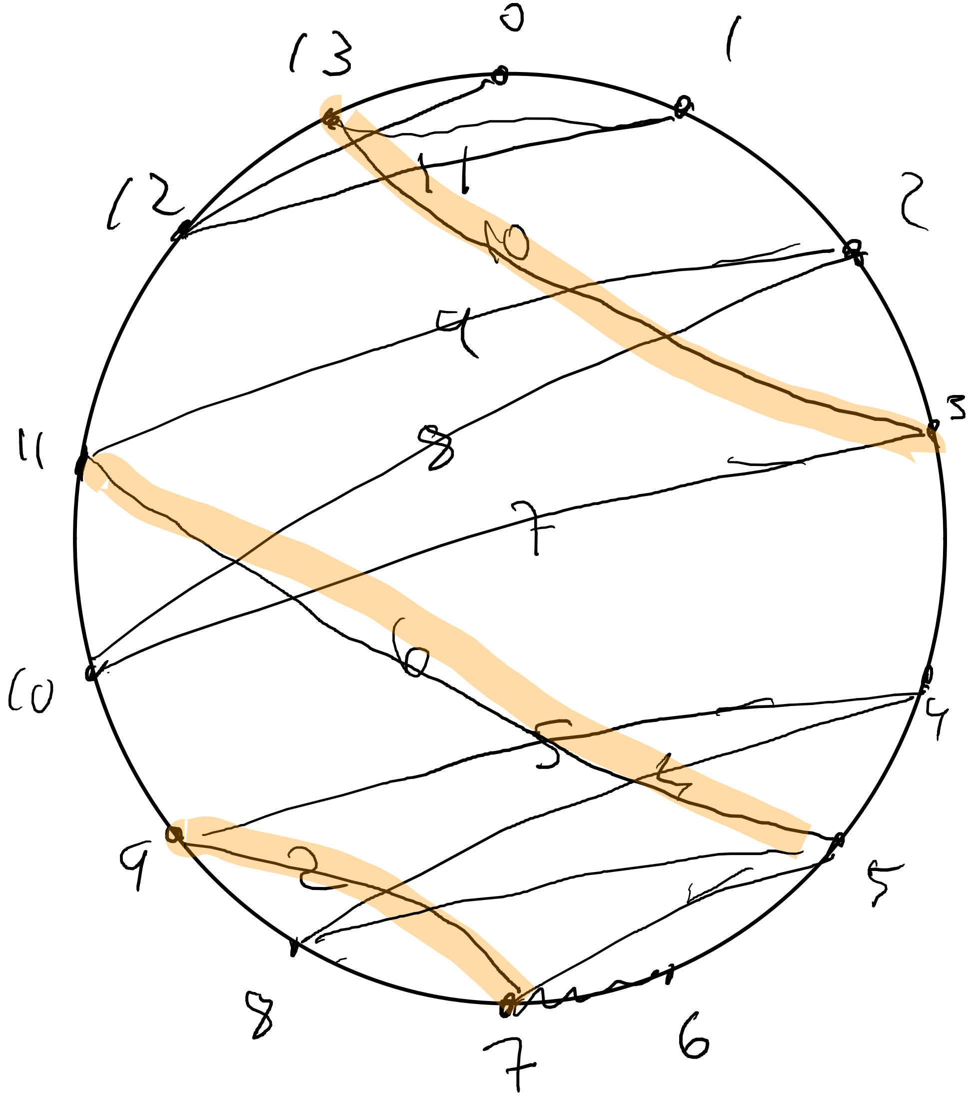
4 5 6 7 8 9



K

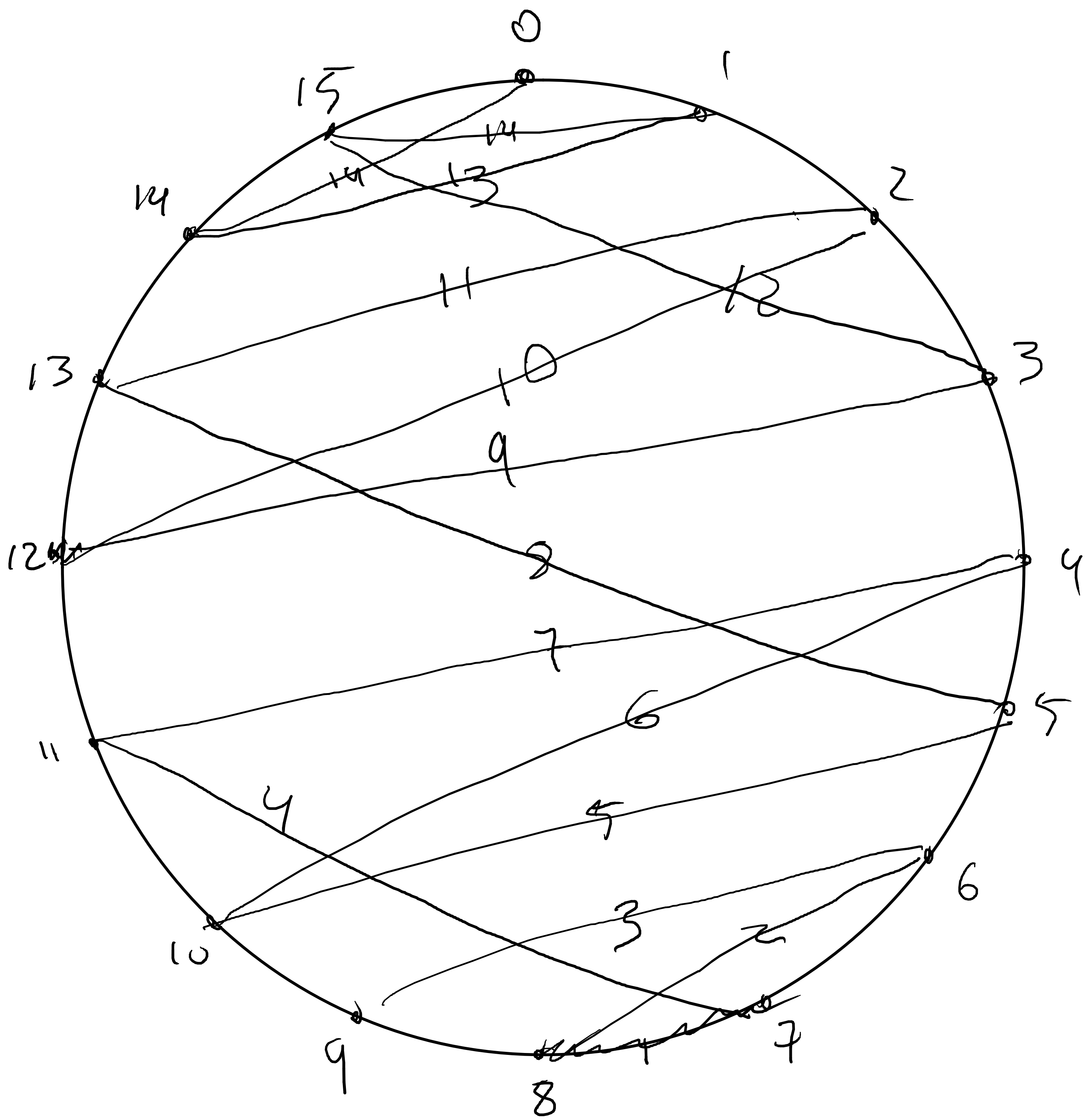
~~1~~ ~~2~~ ~~3~~ 4 ~~5~~ 6 ~~7~~

8 ~~9~~ ~~10~~ ~~11~~ ~~12+2~~



6

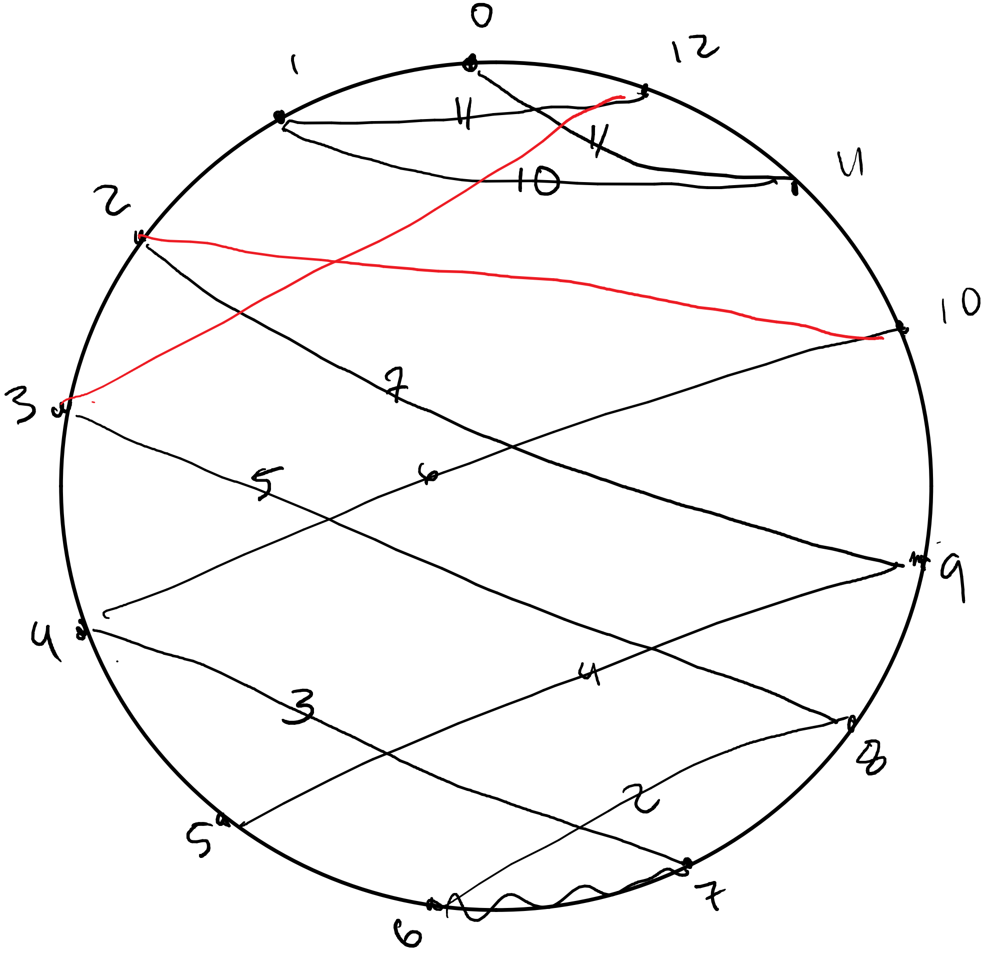
$$\frac{13-3}{2} = 5$$

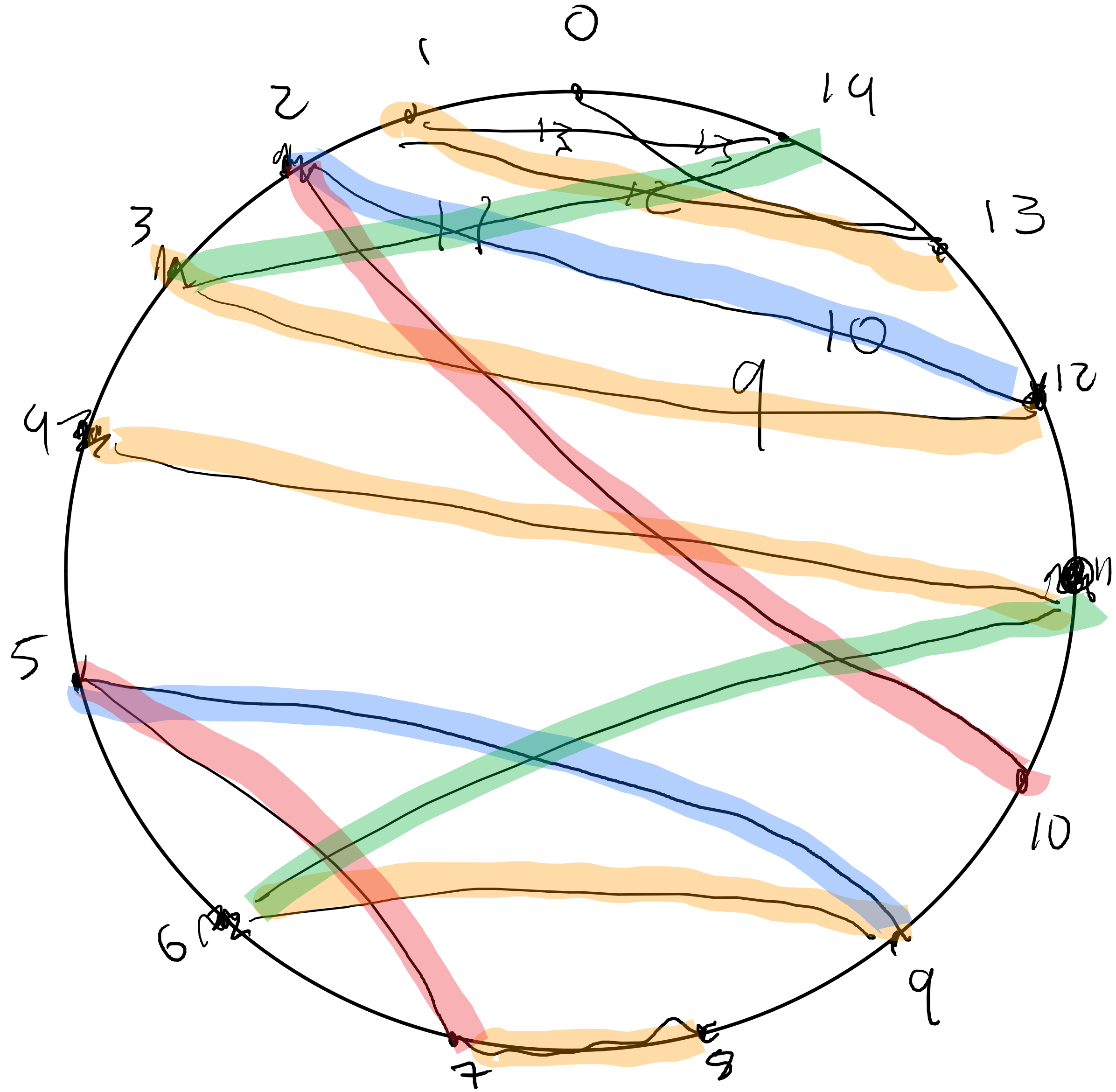


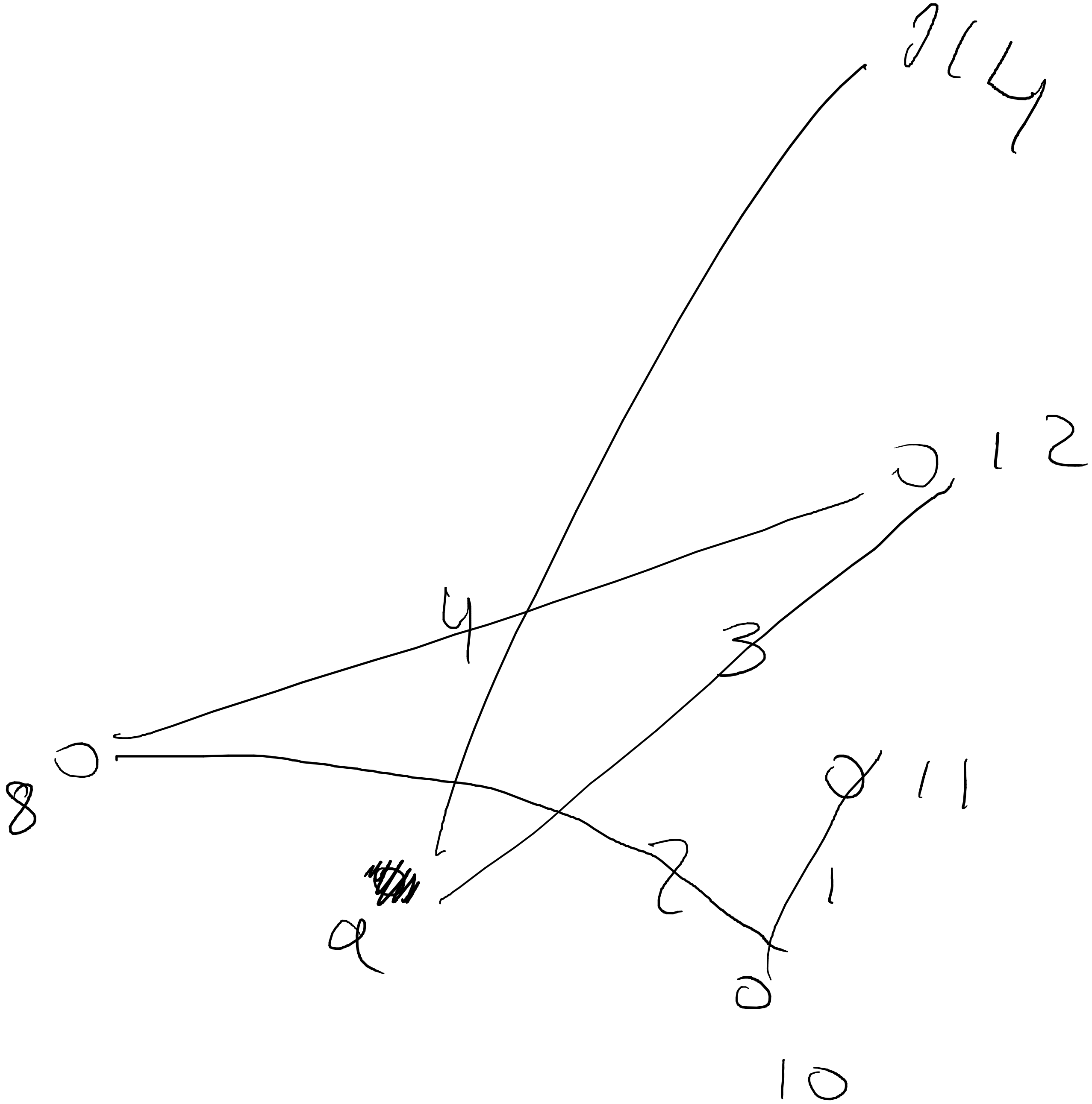
$n = 15$

$\frac{n-3}{2}$

11 10 9

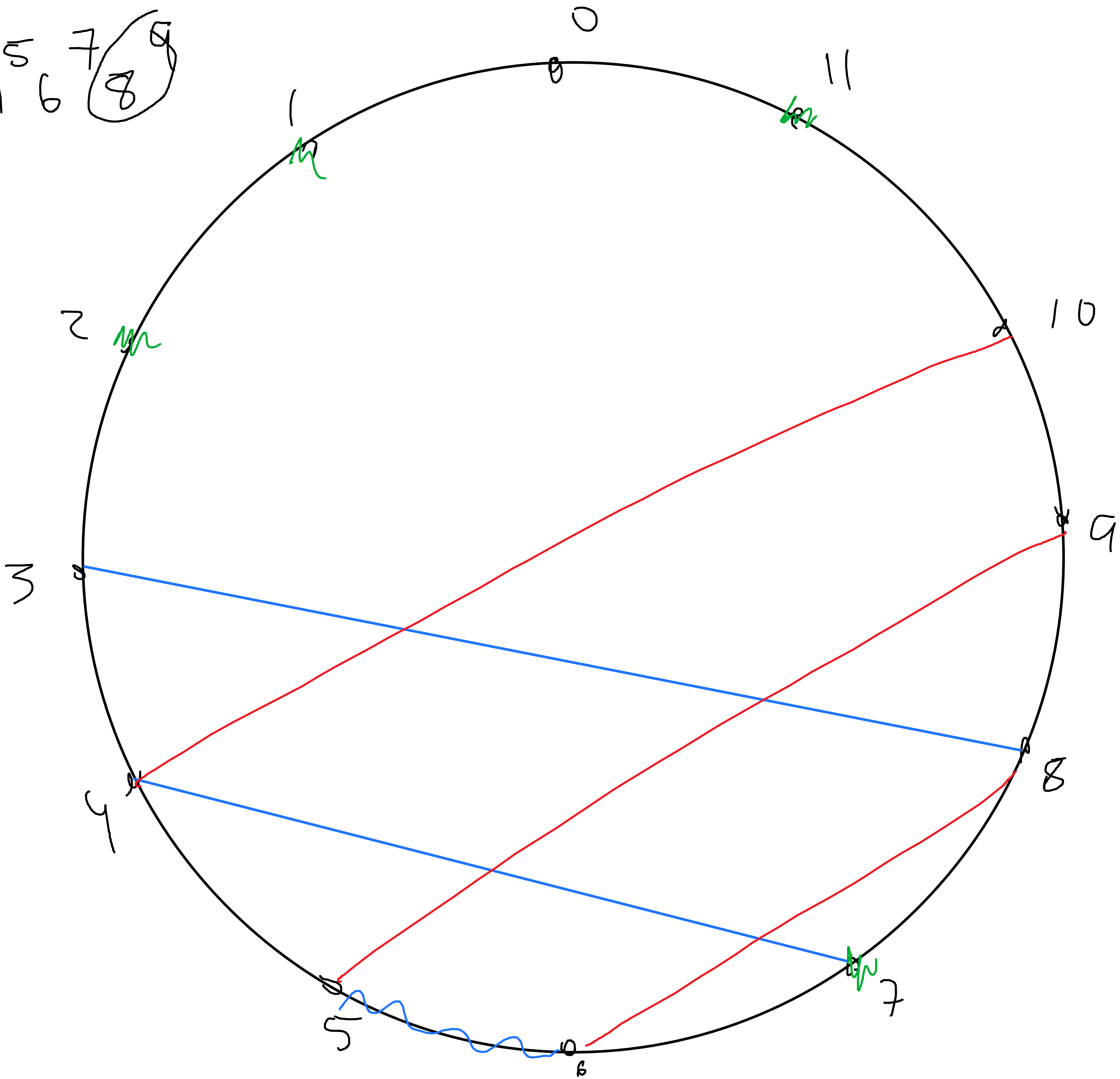






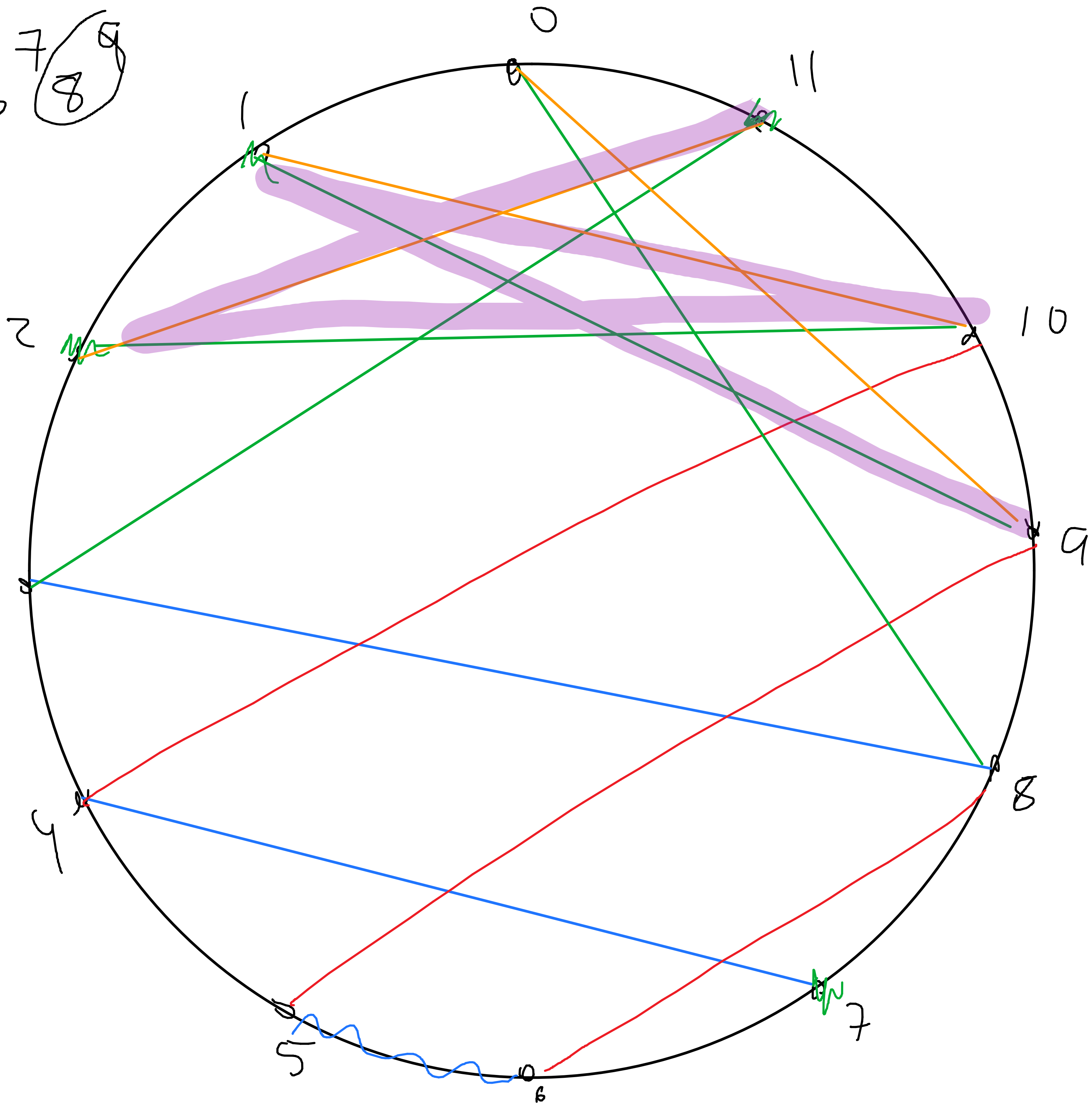
1, 2 3

1 3 5 7 9
2 4 6 8



9
7
5
3
1

1 3 5 7 9
2 4 6 8

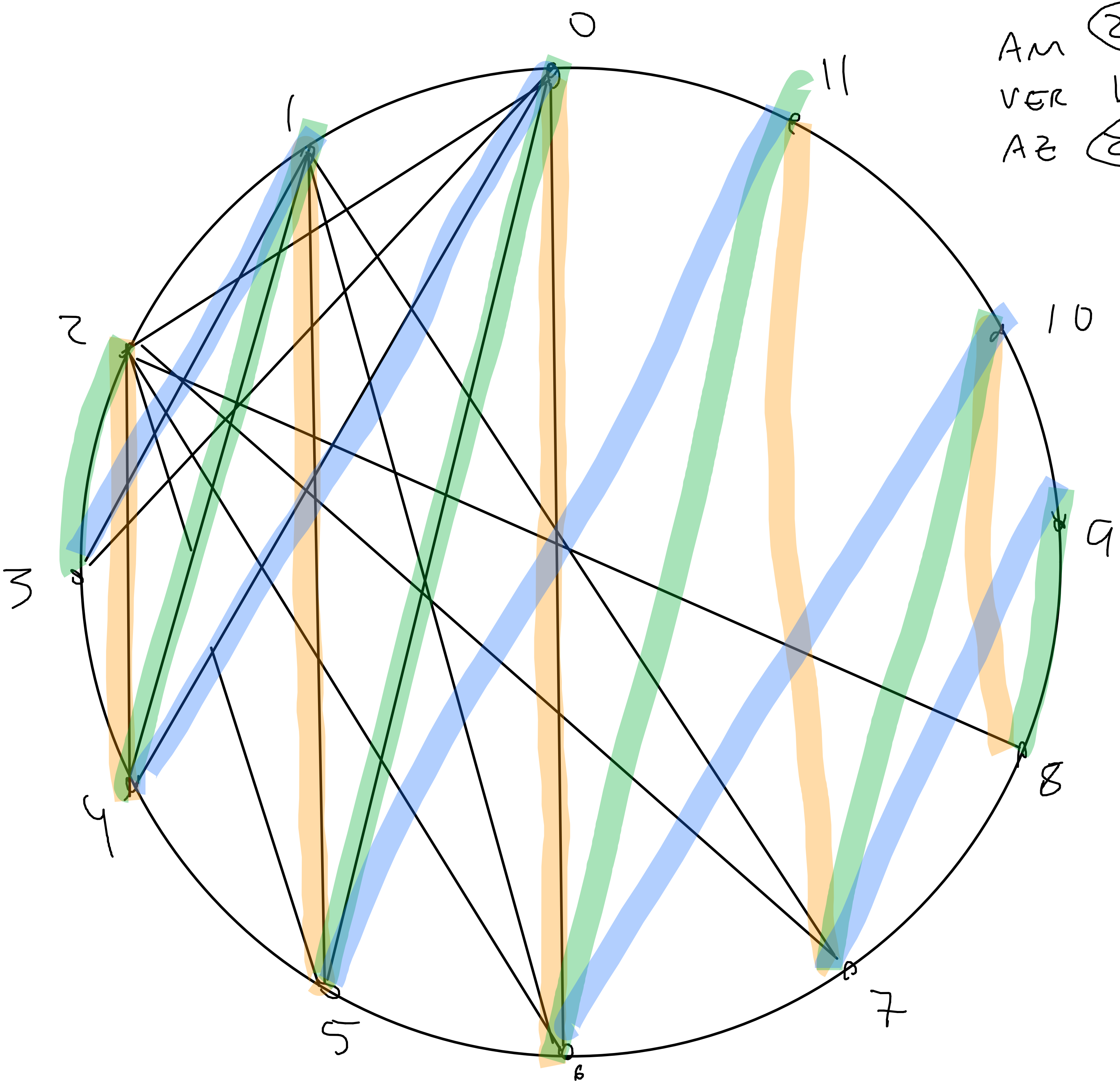


9
7
5
3
1

$n = 11$

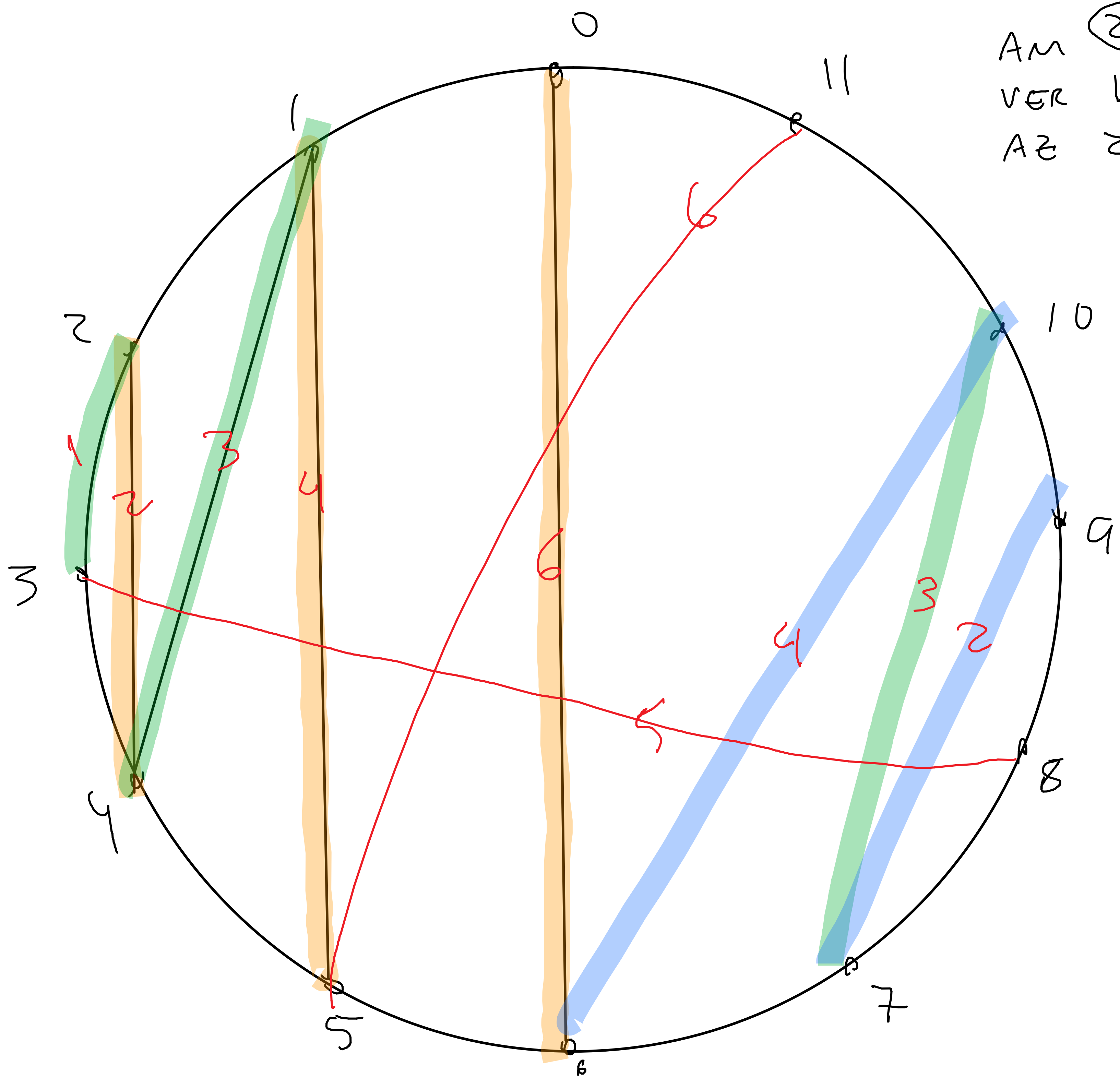
$k = 6$

AM	2	4	6	4	2	
VER	1	3	5	5	3	1
AZ	2	4	6	4	2	



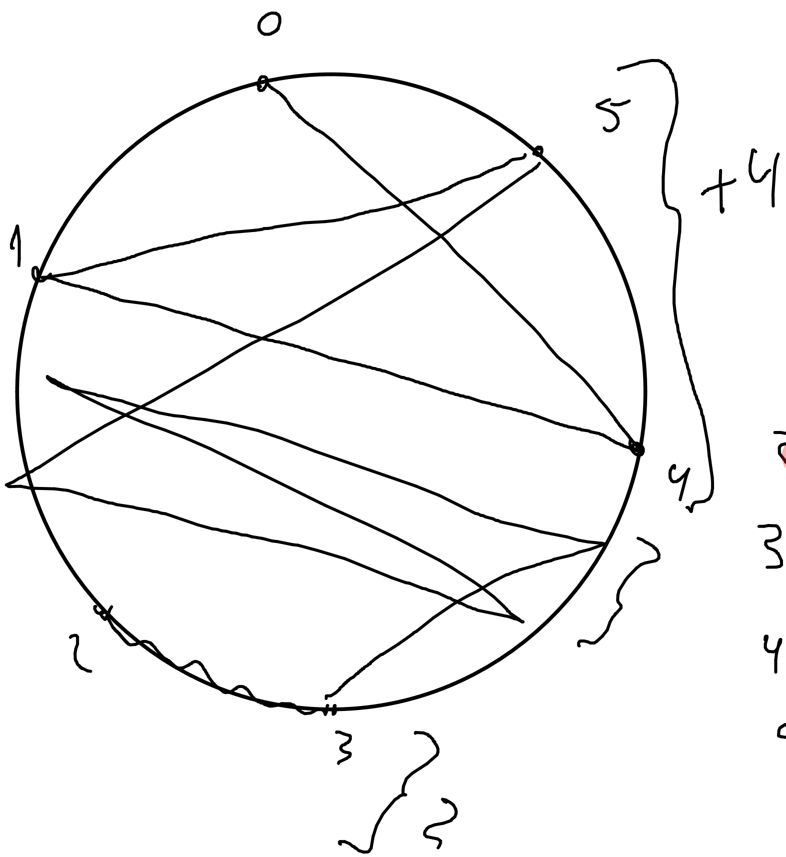
$n = 11$

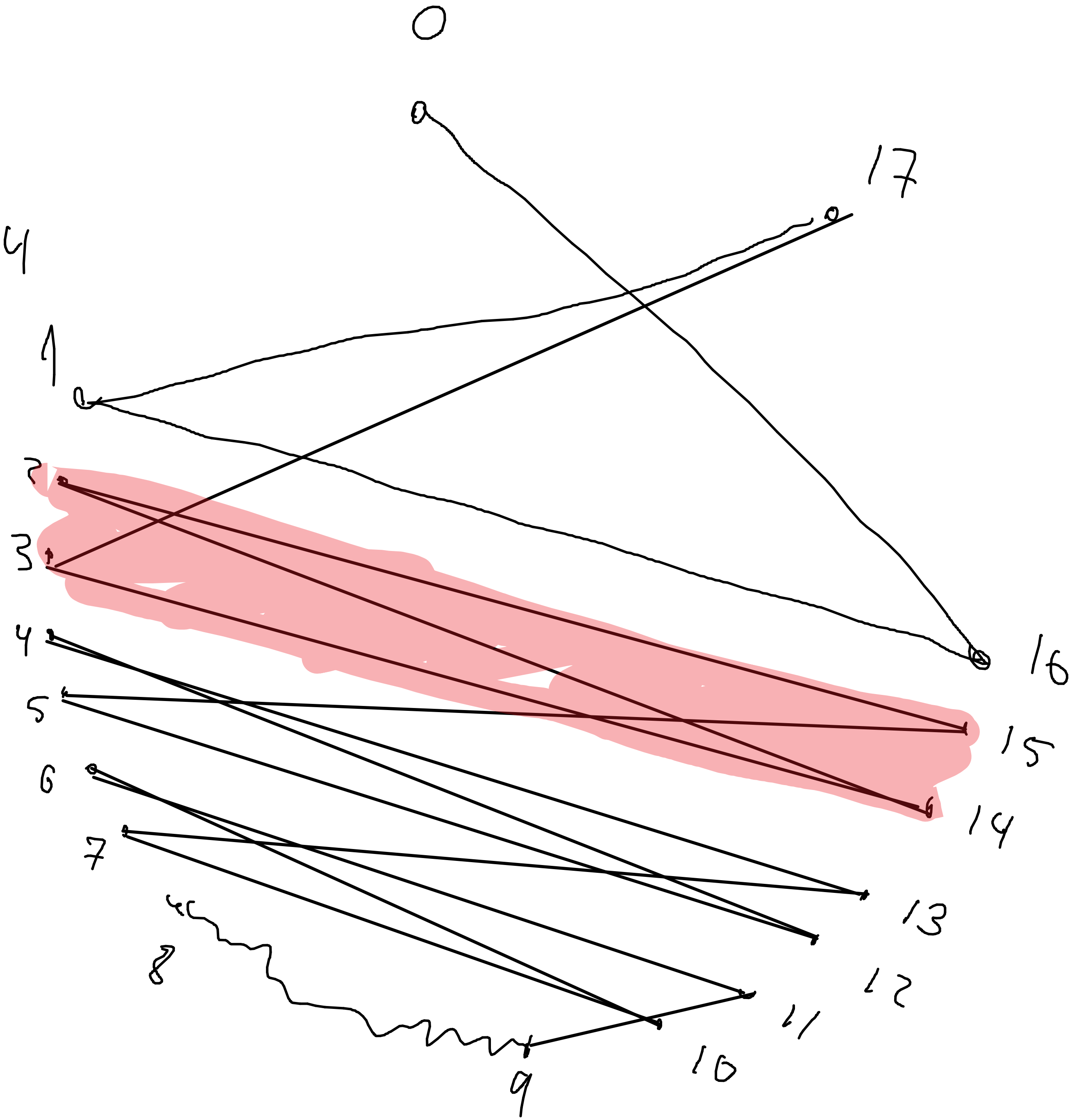
$k = 6$

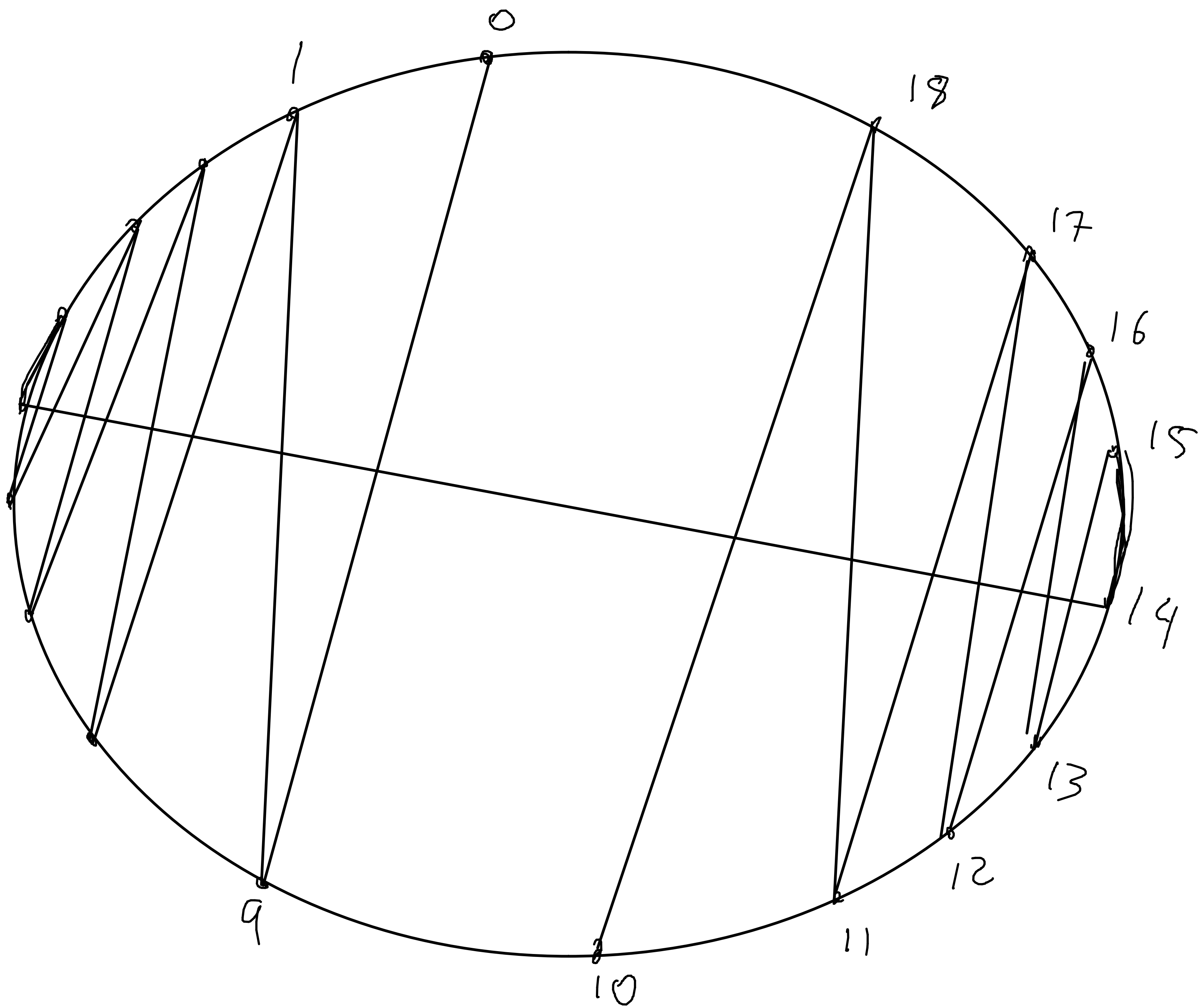


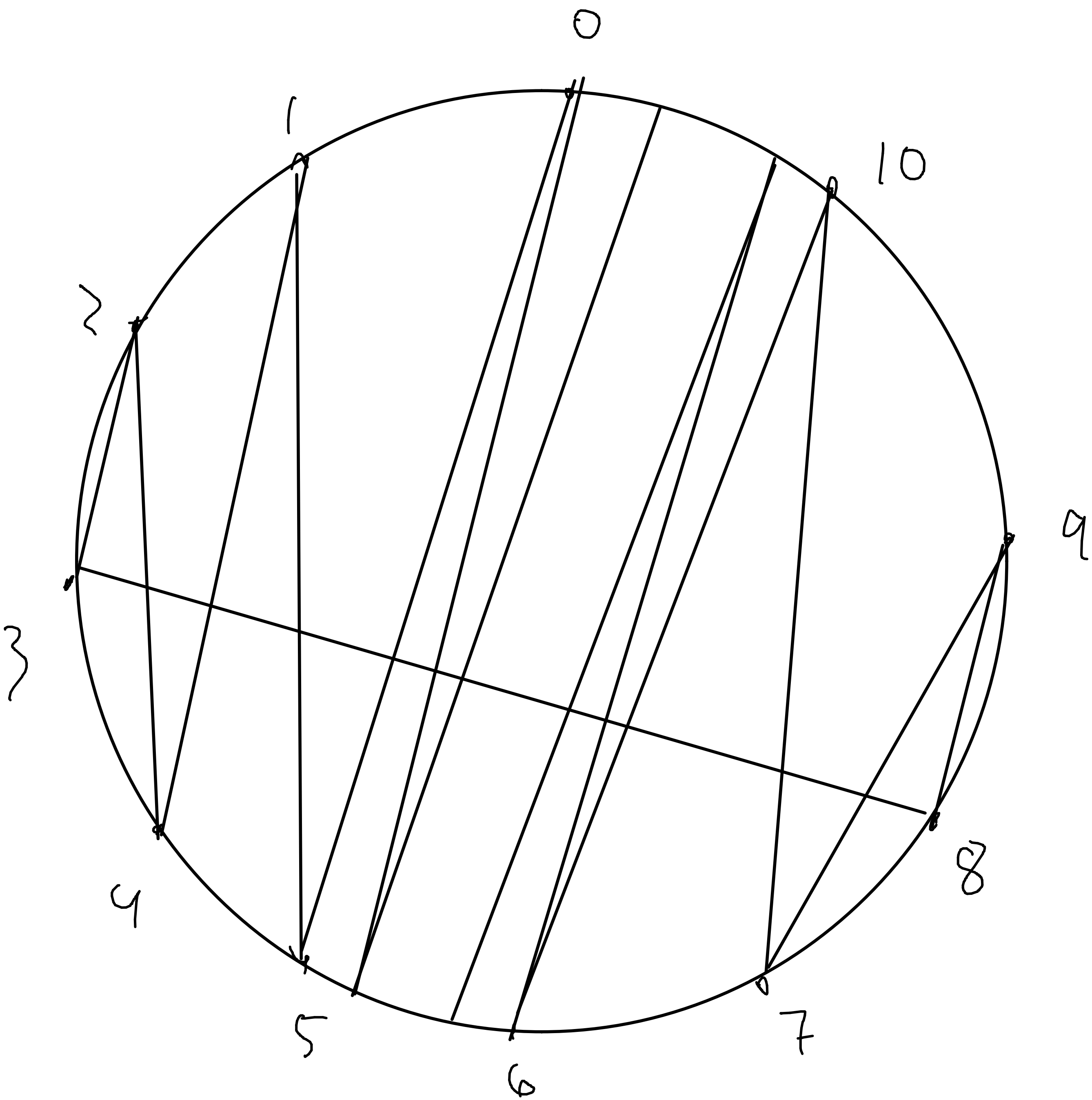
AM	2	4	6	4	2		
VER	1	3	5	5	3	1	
AZ	2	4	6	4	2		

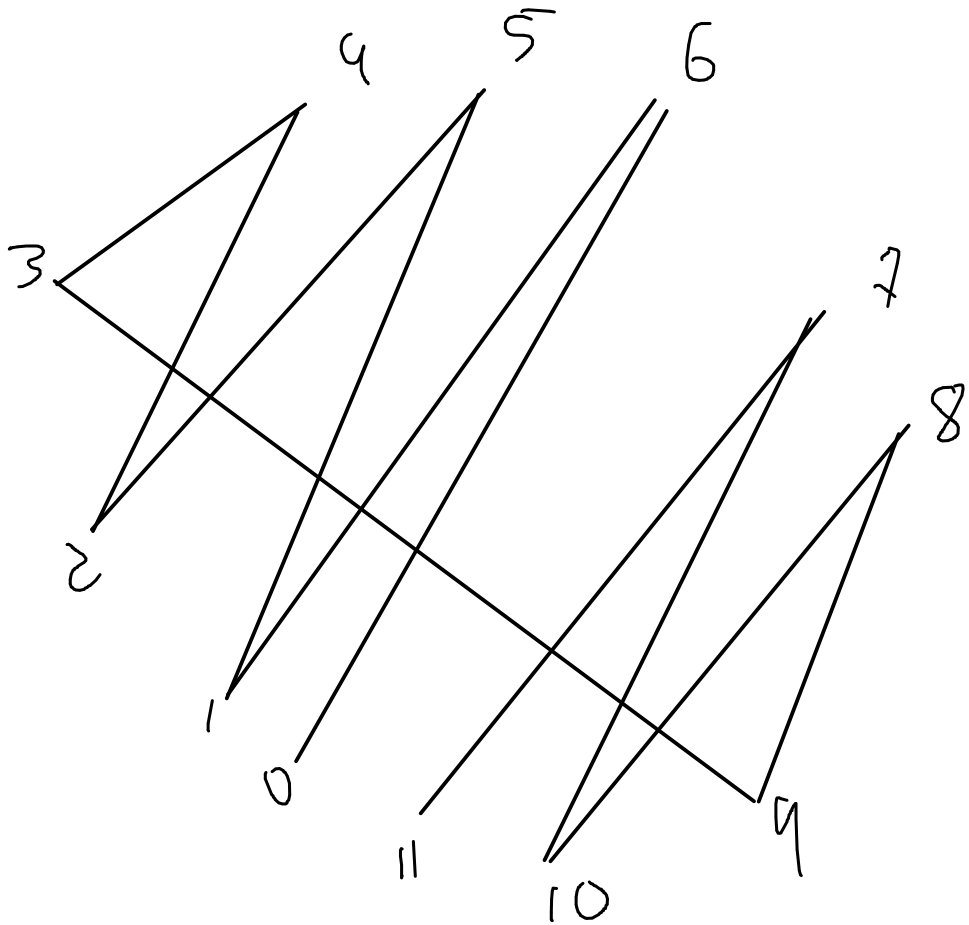
6 5 5


0
1
2
3
4
5
+4
2


0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17


0
1
18
17
16
15
14
13
12
11
10
9


0
1
2
3
4
5
6
7
8
9
10



0
1
2
3
4
5
6
7
8
9
10
11

$n = 10$ 0 1 2 3 4 5 6 7 8 9 10

$k = 5$ 1 2 3 4 5

1 2 3 4 5

$k = 7$ 1 2 3 4 5 6 7

5 6 7

$n = 28$

$k = 14$

$n = 4$

$k = 2$

$n = 6$

$k = 5$

16, 17, 18, 19, 20

$n = 10$

$k = 9$

$n = 10$

$k = 5$

0

20

$k = 14$ 1 2 3 4 5 6 7 8 9 10 11 12 13 14

1 2 3 4 5 8 7 8 9 10 11 12 13 14

$n = 15$

$k = 14$

(n, k)

(n, k, e)

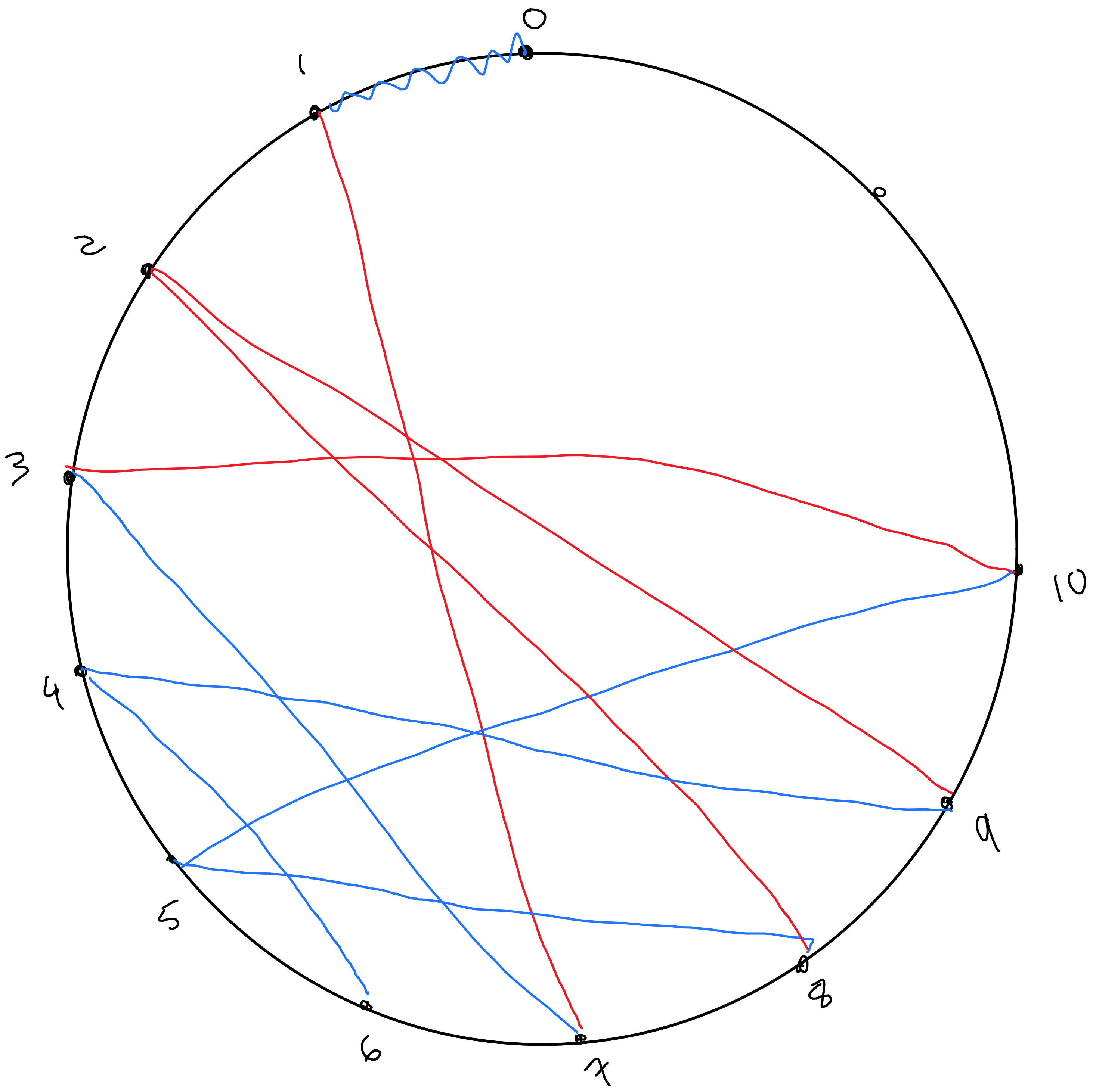
$\hookrightarrow \quad |e| \leqslant k$

$n = 12$

$k = 6$

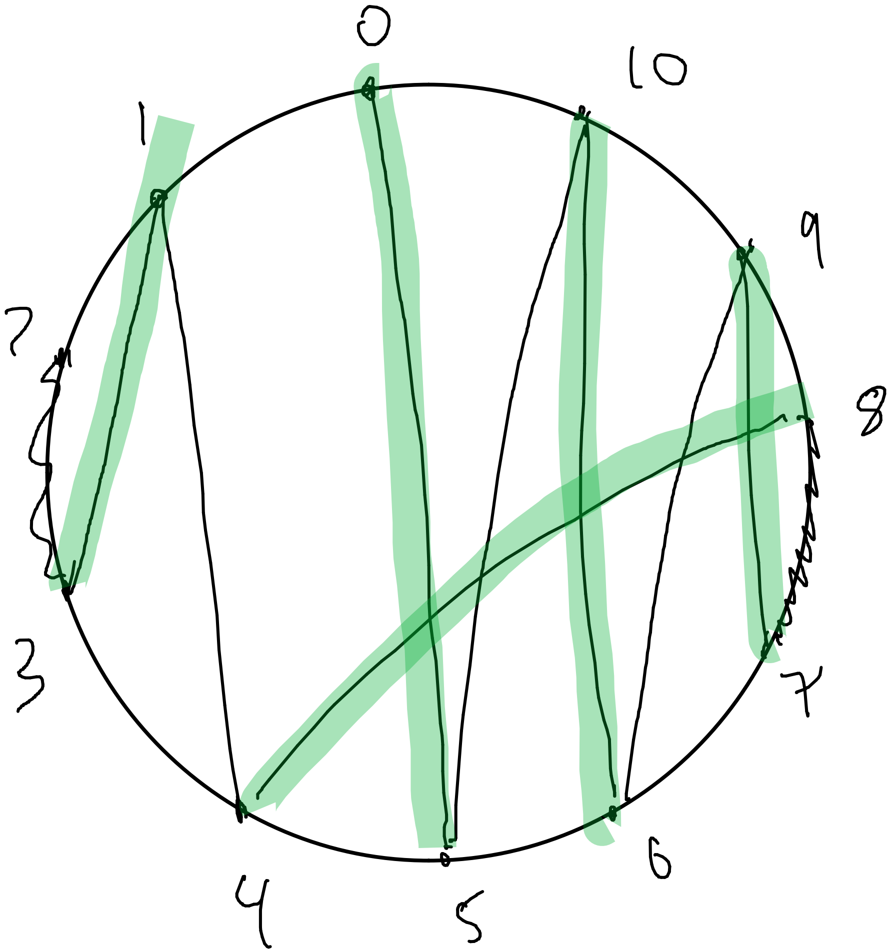
$e = ?$

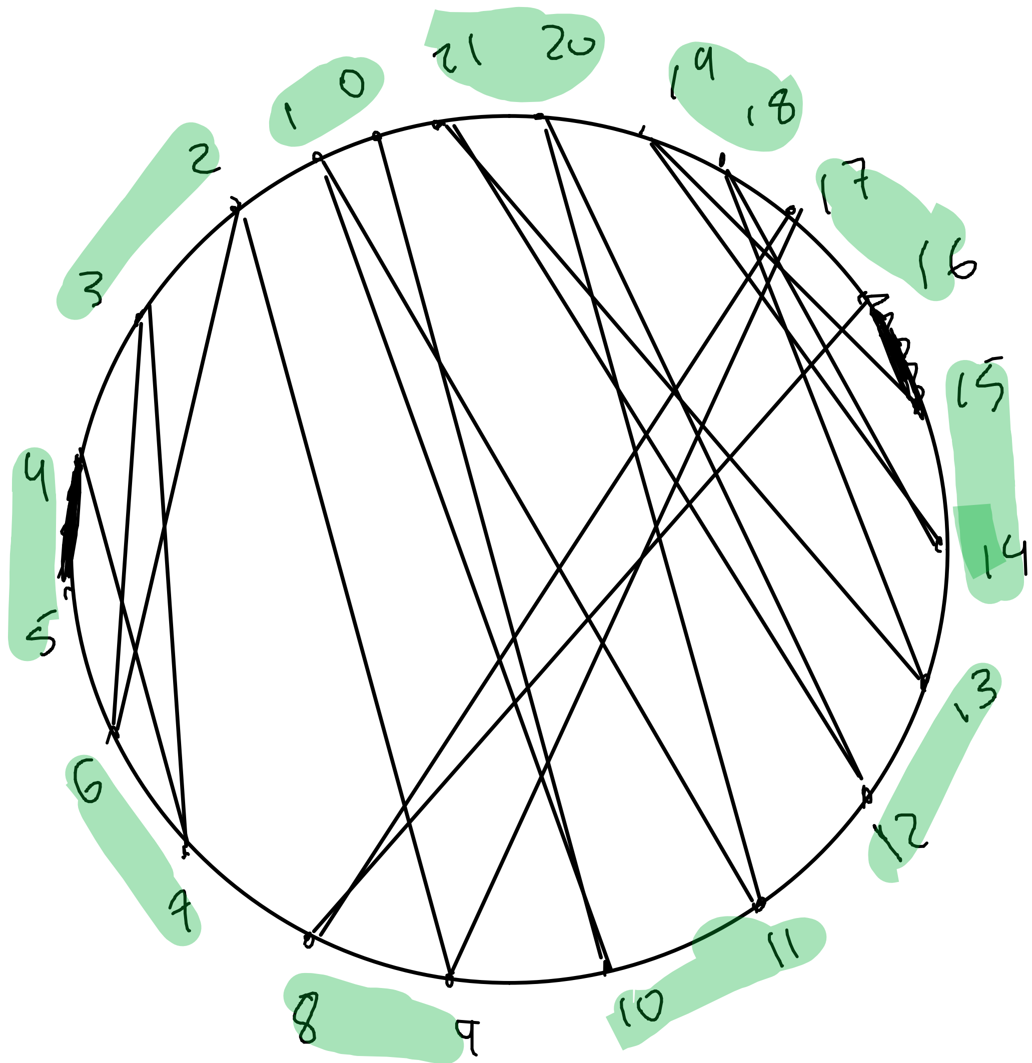
$(10, 5, (5, 6))$

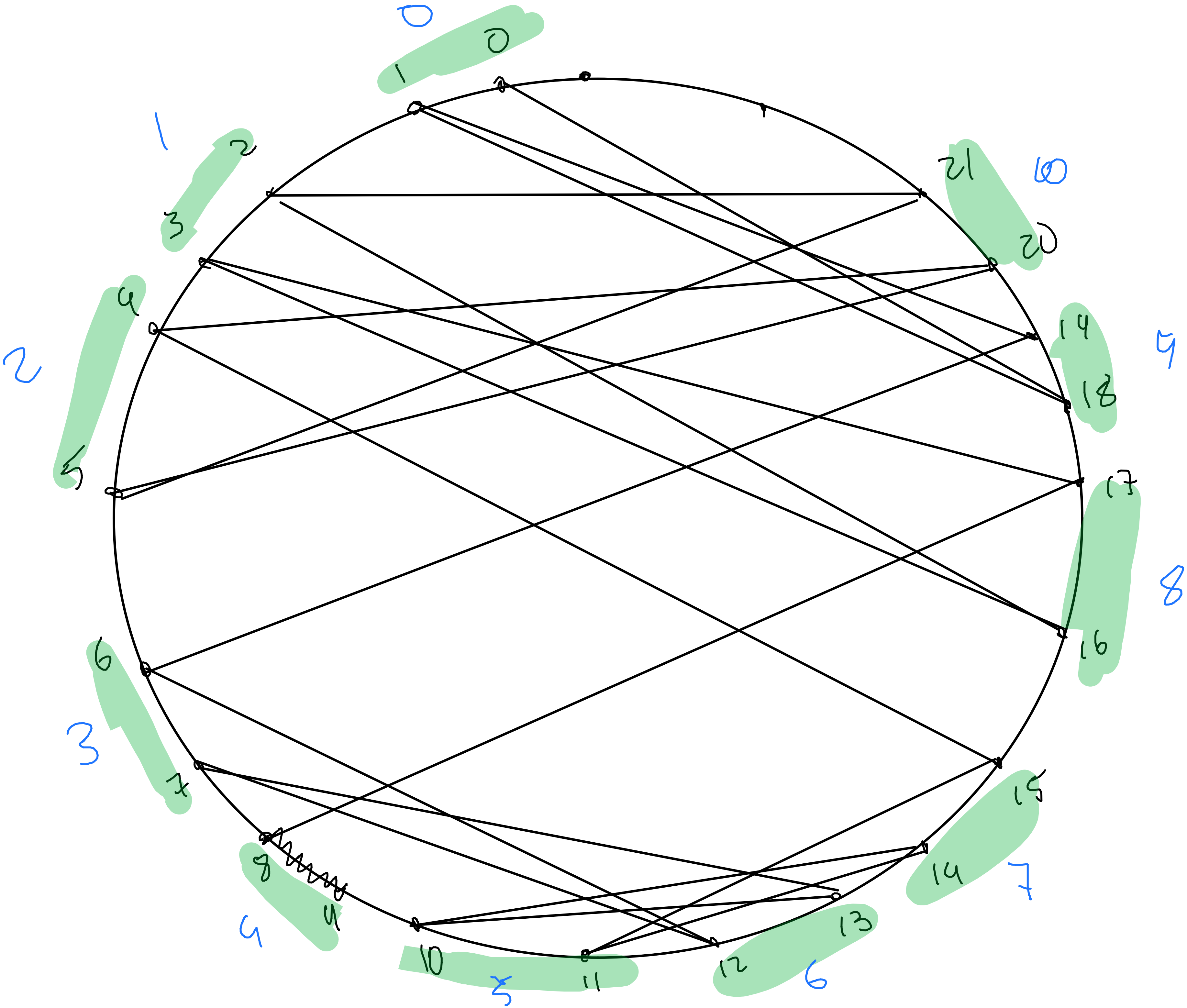


0
1
2
3
4
5
6
7
8
9
10

$i \rightsquigarrow 2i, 2i+1$

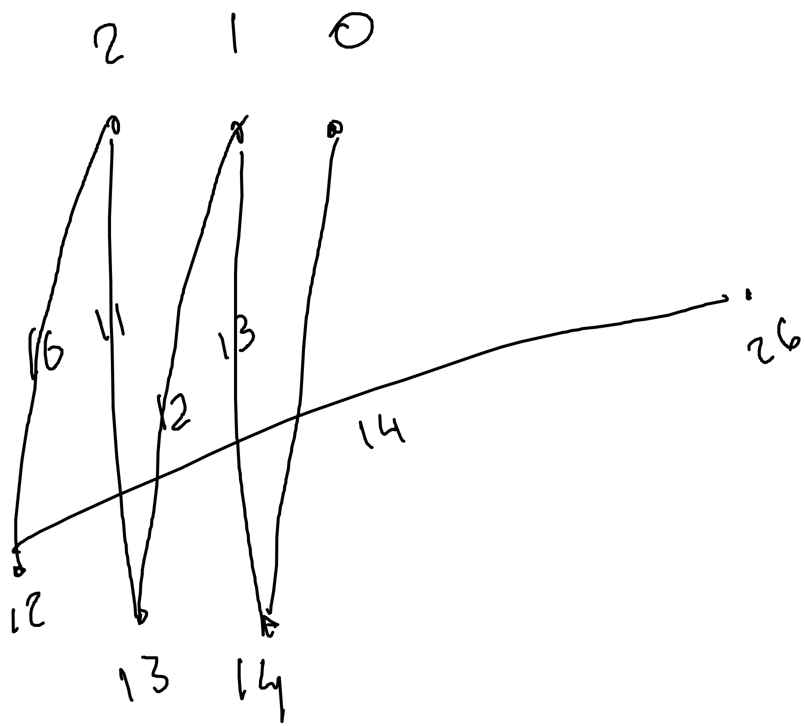






0
0
1
1
2
3
2
4
5
21
10
20
14
9
18
17
8
16
6
3
7
15
14
7
8
9
4
10
5
11
12
6
13

$n = 20$



$n = 10$
$k = 9$

$n = 10$
$k = 5$

1 2 3 4 5 6 7 8 9 10 11 12 13 14
9 10 11 12 13 14

$n = 10$
$k = 9$

$n = 20$

1 2 3 4 5 6 7 8 9 10 11 12 13 14
9 10 11 12 13 14

MIN. Parallels

$\pi = 0 \quad \cdots$

$1 \quad \cdots \quad n$

$1 \cdot (n-1) \cdot (n-1) \cdot \cdots \cdot 1 = (n-1)(n-1)!$

$= n! - (n-1)!$

$\pi' = (|\pi_1 - \pi_0|, \ldots, |\pi_n - \pi_{n-1}|)$

$\mathrm{COUNT}_{n-1}(\pi') = (C_1^{\pi'}, \ldots, C_k^{\pi'}, 0, \ldots, 0) \quad C_i^{\pi'} = |\{J : |\pi_J - \pi_{J-1}| = i, 1 \leq J \leq n\}|$

$\sum C_i^{\pi'} = n$

QUEREMOS ENCONTRAR

$(1, 1, \ldots, 1, \underset{\uparrow}{2}, 2, \ldots, \underset{\uparrow}{2}, 0, \ldots, 0)$

$2k - n + 1$

$0 \ldots n$

n^{n-1}

$S_n^{n-1} \subseteq E_{n-1} = \{0, \ldots, n\}^{n-1}$

$\shortparallel$

$\{x \in E_{n-1} : |x| = n\}$

$|S_n| = \sum_{i=1}^{n}$

$(i, \underbrace{\cdots}_{S_{n-i}^{n-2}})$

$$S_n^{n-1} \subseteq E_{n-1} = \{0, \ldots, n\}^{n-1}$$

$0 \ldots n$

$$(i, \underbrace{\ldots}_{S_{n-i}^{n-2}})$$

$$\| \quad \{x \in E_{n-1} : |x| = n\}$$

$$|S_n| = \sum_{i=1}^{n}$$

$$s_m^k = |S_m^k|$$

$$s_m^1 = m \qquad \forall m$$

$$s_n^k = \sum_{i=0}^{n} s_{n-i}^{k-1}$$

$$S_m^k = \left\{x \in \mathbb{N}^k : x = (x_1, \ldots, x_k) \in \sum x_i = m\right\}$$

$$s_m^k = |S_m^k|$$

$\prod_0^n$

$\supset 9 \cdot 8 \cdot 7 \ldots 4 \; 5$

DADO i, QUANTOS CAMINHOS POSSUEM PELO MENOS UMA i-ARESTA?

$1, \ldots, \cancel{4}, \cancel{5} \quad 11$

HÁ $n-i+1$ ARESTAS POSSÍVEIS DO TIPO i

$(0,i), (1,i+1), \ldots, (n-i,n)$

(a,b) $\quad$ $b>a$

(b,a)

$1 \cdot (n-1)!$

$2n \cdot (n-2)!$

$n + n - 1 = 2n-1$

$(2n-1)(n-2)!$

$(n-1)(n-1)!$

$0, 5, 4$

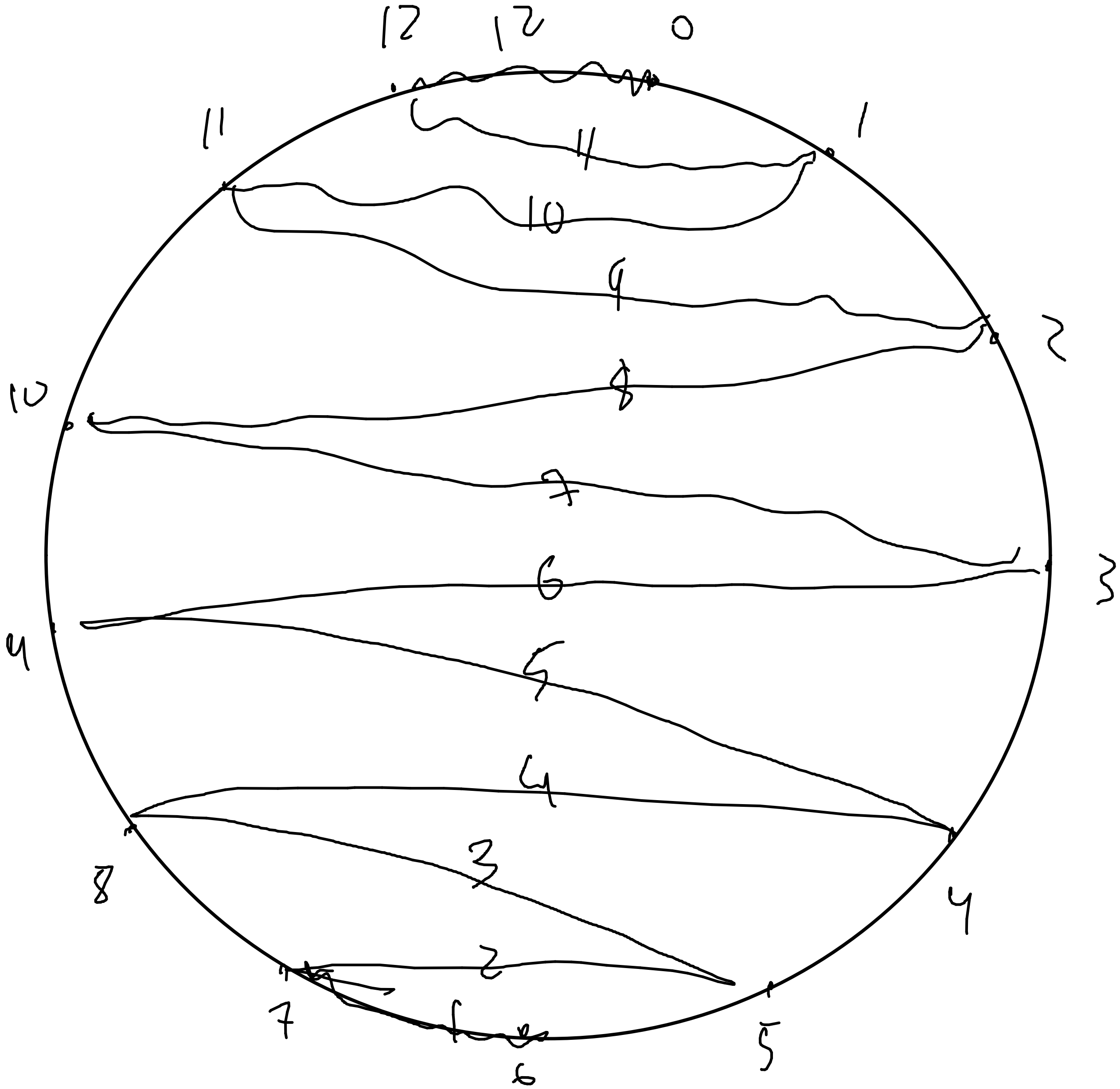
$2n$

$(n-1)^2$

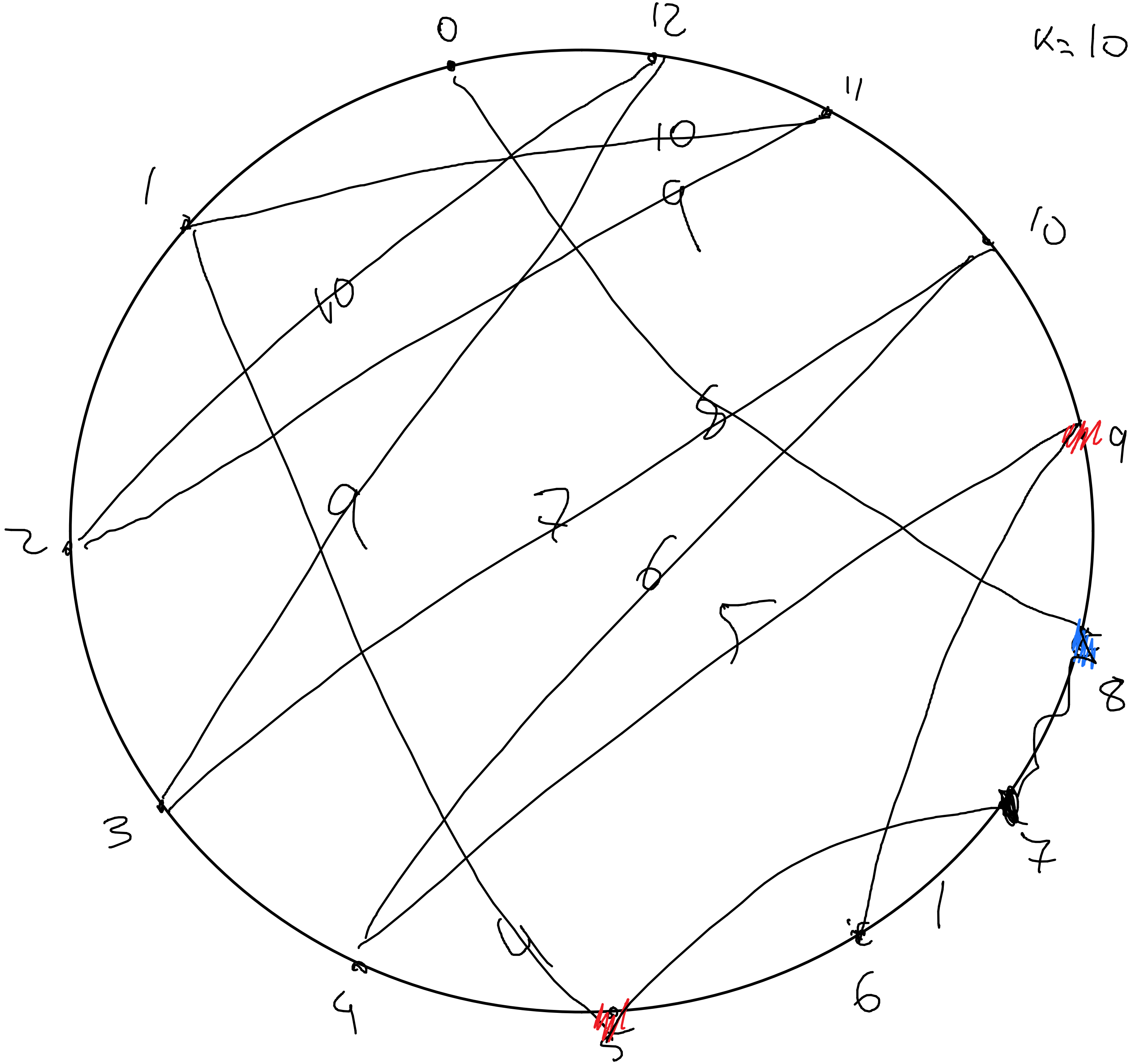
$4 \; 5$

$0 \; \underbrace{i \ldots}\; 5 \; 4 \; \underbrace{\ldots}$

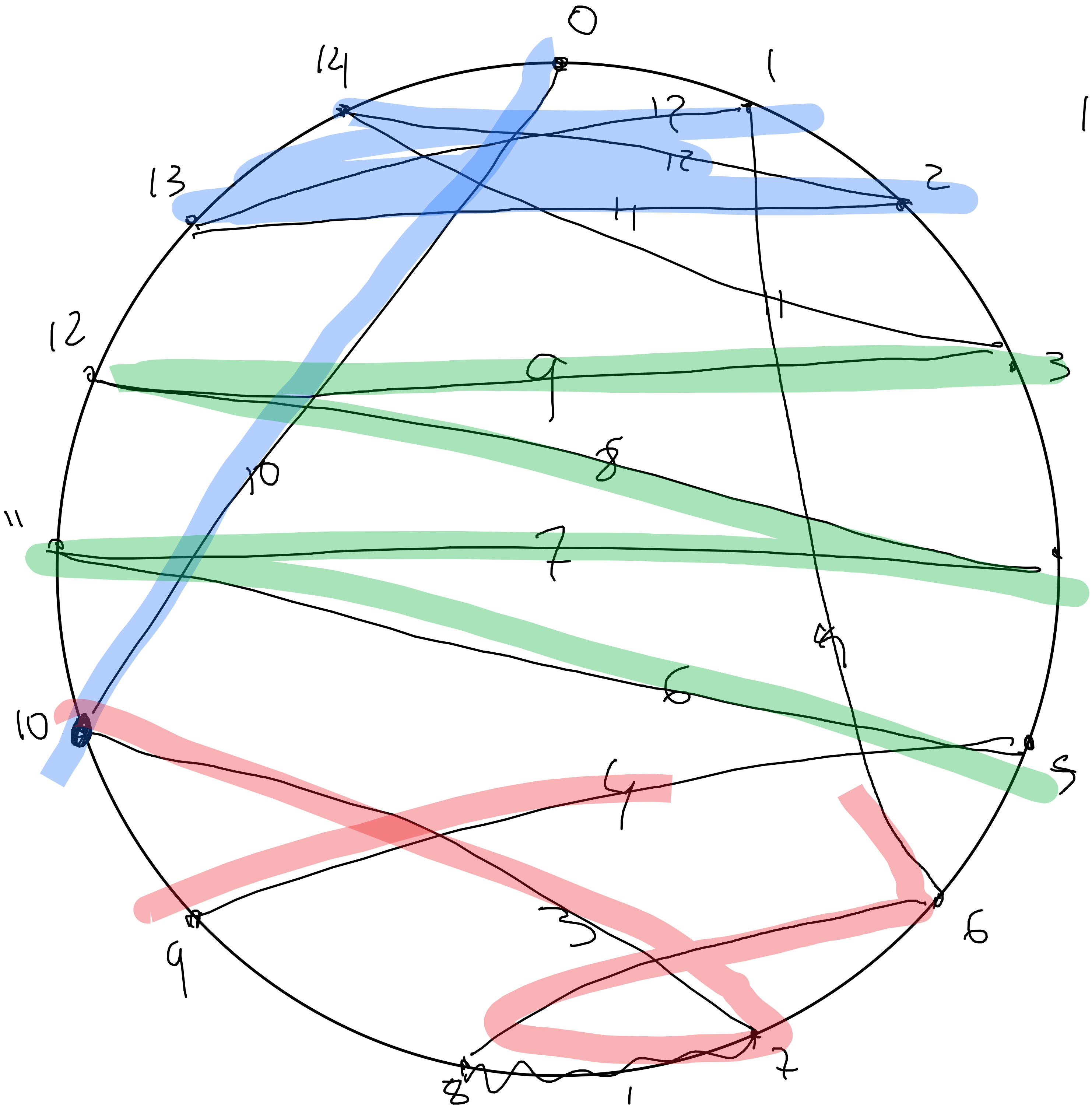
$\geq (n-1)(n-1)! - (n-1)! - 2n(n-2)! - (2n-1)(n-2)! = \left((n-1)^2 - (n-1) - 2n - (2n-1)\right)(n-2)!$


12
12
0
11
1
11
10
2
9
10
8
7
3
6
5
4
8
4
3
2
7
5
6

n - 2
k = 10



3, 2, 1



1, 2, 3, 4, 5, 6