

# Samuelsonite: its crystal structure and relation to apatite and octacalcium phosphate

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## Abstract

Samuelsonite,  $(\text{Ba}_{0.42\text{--}0.58})(\text{Ca}_{0.46\text{--}0.54})_2(\text{Mn}_{0.45}^{2+}\text{Fe}_{0.30}^{2+}\text{Na}_{0.25}^{1+})_4\text{Ca}_8\text{Al}_2(\text{OH})_2(\text{PO}_4)_{10}$ , monoclinic,  $a$  18.495(10),  $b$  6.805(4),  $c$  14.000(8) Å,  $\beta$  112.75(6)°, space group  $C2/m$ ,  $Z = 2$ , is a novel structure type related to apatite and octacalcium phosphate.  $R = 0.084$  for 2571 independent reflections.

Samuelsonite, apatite, and octacalcium phosphate contain regions in their structures which are isomorphic to each other. Beyond these regions, structural isomorphism ceases to exist. The underlying unit is a column of composition  $[\text{Ca}_4(\text{PO}_4)_{12}]$ . In samuelsonite, this unit is fused by a screw axis to form double columns of composition  $[\text{Ca}_4(\text{PO}_4)_{10}]$ ; in octacalcium phosphate, sheets are generated by inversion centers to form  $[\text{Ca}_4(\text{PO}_4)_8]$ ; in apatite, the columns form a framework of composition  $[\text{Ca}_4(\text{PO}_4)_6]$ . A related column occurs in the crystal structure of hanksite,  $\text{Na}_{20}(\text{CO}_3)_2\text{Cl}[\text{KN}_{12}(\text{SO}_4)_9]$ .

Hypotheses are advanced for growth of apatite, whose central argument is the inherent stability of the  $[\text{Ca}_4(\text{PO}_4)_{12}]$  columns; disorder and calcium deficiencies in some apatites may arise from the rotational disorder of the cylindrical dense-packing of the columns.

## Introduction

Samuelsonite,  $(\text{Ca},\text{Ba})\text{Fe}_2^{2+}\text{Mn}_2^{2+}\text{Ca}_8\text{Al}_2(\text{OH})_2(\text{PO}_4)_{10}$ , is a new mineral from the famous Palermo No. 1 pegmatite, North Groton, New Hampshire. Moore *et al.* (1975) noted that the species occurs in two distinct paragenetic settings, the one as small lustrous prismatic crystals in cavities of whitlockite-carbonate apatite-siderite rock, the other as large (up to 4 cm) bladed aggregates in association with a disintegrated phosphate pod (heterosite?). A structural kinship to apatite was recognized which, in relationship with octacalcium phosphate,  $\text{Ca}_8\text{H}_2(\text{PO}_4)_6 \cdot 5\text{H}_2\text{O}$ , adds interest to the species. In addition, the complex crystal chemistry of samuelsonite did not admit certain interpretation of its composition in absence of knowledge of its atomic positions and their populations, and structure analysis was necessary to resolve these arguments.

Samuelsonite possesses a noteworthy structure, allied to apatite and octacalcium phosphate. With its structure at hand, we conclude this paper with some speculations on apatite stability and advance an hypothesis to rationalize fragmented units of the apatite structure which are now known to persist in other structure types.

## Experimental section

A single crystal of samuelsonite was selected from the type material and prepared for a three-dimensional data set from a *Paired* automated diffractometer. We adopted the crystal cell data from Moore *et al.* (1975) and summarize these results in Table 1.

Table 1 also outlines the experimental details of the structure study. Owing to the thin and elongate habit of the crystal, eight facets were selected to approximate a polyhedral shape suitable for absorption correction on the basis of a Gaussian integration method (Burnham, 1966). Estimated errors of the intensities ( $\sigma_I$ ) were calculated from  $\sigma_I^2 = S + t^2B$  where  $S$  = peak scan counts,  $B$  = total background counts, and  $t$  = ratio of peak to background times. For the reflections with  $I < 2\sigma_I$ , we set  $I = \sigma_I$ . The  $\sigma_I$ 's were then converted directly to the estimated errors in structure factors.

There were 2571 independent  $F_o$  available for study, but we photographically estimated 19 additional reflections within the blind region of the diffractometer and used these only for the Patterson synthesis. The space group  $C2/m$  was checked for centrosymmetry by the  $N(z)$  (Howells *et al.*, 1950) test on special projections and the  $P(r)$  (Srikrishnan

H	K	L	FC	FC	H	K	L	FC	FC	H	K	L	FC	FC	H	K	L	FC	FC
24	0	0	66.2	60.2	12	0	€	147.8	148.6	4	0	-4	409.0	335.3	17	1	0	80.0	82.8
24	0	-1	6.1	16.2	12	0	5	5.3	11.3	4	0	-5	95.6	102.0	17	1	-1	12.6	8.6
24	0	-2	15.7	2.0	12	0	4	27.9	26.8	4	0	-6	269.8	262.9	17	1	-2	135.4	131.1
24	0	-3	18.2	13.5	12	0	3	18.5	16.0	4	0	-7	121.9	126.1	17	1	-3	24.3	19.9
24	0	-4	63.0	54.5	12	0	2	37.3	37.9	4	0	-8	119.7	121.9	17	1	-4	69.0	71.1
24	0	-5	48.6	42.7	12	0	1	60.2	65.4	4	0	-9	172.6	173.6	17	1	-5	51.0	52.1
24	0	-6	35.9	32.3	12	0	0	212.0	228.4	4	0	-10	132.1	138.9	17	1	-6	59.1	61.2
24	0	-7	21.0	21.1	12	0	-1	33.8	33.8	4	0	-11	39.2	39.0	17	1	-7	40.7	42.8
24	0	-8	13.4	4.2	12	0	-2	20.2	21.7	4	0	-12	18.1	4.3	17	1	-8	67.8	72.8
24	0	-9	102.9	106.5	12	0	-3	141.0	149.4	4	0	-13	173.5	177.4	17	1	-9	13.8	8.6
24	0	-10	58.0	101.8	12	0	-4	46.8	35.6	4	0	-14	34.3	35.1	17	1	-10	55.8	58.3
24	0	-11	6.2	16.6	12	0	-5	52.9	47.9	4	0	-15	25.8	26.2	17	1	-11	5.8	7.7
24	0	-12	6.0	2.4	12	0	-6	22.4	20.6	4	0	-16	28.5	28.7	17	1	-12	21.6	23.4
24	0	-13	40.6	44.1	12	0	-7	218.9	212.3	4	0	-17	79.1	75.8	17	1	-13	19.3	18.0
24	0	-14	70.7	72.4	12	0	-8	130.1	127.8	4	0	-18	27.0	17.6	17	1	-14	37.9	41.9
22	0	-15	6.1	9.8	12	0	-9	88.4	82.0	2	0	-18	15.7	0.6	17	1	-15	62.2	62.8
22	0	-14	5.9	8.7	12	0	-10	50.8	48.1	2	0	-17	26.9	26.8	17	1	-16	20.4	15.9
22	0	-13	35.1	35.4	12	0	-11	32.8	35.6	2	0	-16	39.9	36.3	17	1	-17	20.4	15.9
22	0	-12	5.8	2.5	12	0	-12	36.2	37.5	2	0	-15	38.9	38.1	15	1	-18	19.3	33.1
22	0	-11	5.8	7.1	12	0	-13	53.3	52.6	2	0	-14	44.4	42.8	15	1	-18	67.5	66.7
22	0	-10	72.1	75.3	12	0	-14	37.5	42.0	2	0	-13	16.0	17.5	15	1	-17	14.1	8.2
22	0	-9	5.9	14.1	12	0	-15	14.0	2.5	2	0	-11	69.2	70.6	15	1	-15	37.4	38.5
22	0	-8	18.4	30.4	12	0	-16	39.4	38.4	2	0	-10	36.8	38.8	15	1	-14	23.0	22.0
22	0	-7	105.1	99.8	12	0	-17	47.8	47.1	2	0	-9	105.0	120.6	15	1	-13	74.4	74.5
22	0	-6	43.9	41.3	10	0	-18	22.1	15.3	2	0	-8	112.6	128.9	15	1	-12	43.5	43.5
22	0	-5	46.1	44.3	10	0	-17	34.8	45.8	2	0	-7	122.1	158.9	15	1	-10	65.8	66.5
22	0	-4	5.9	8.2	10	0	-16	42.8	32.2	2	0	-6	164.0	158.9	15	1	-9	61.4	62.0
22	0	-3	52.4	46.1	10	0	-15	72.0	72.3	2	0	-5	367.9	328.5	15	1	-8	11.4	3.7
22	0	-2	18.1	12.3	10	0	-14	93.0	99.4	2	0	-4	78.0	74.4	15	1	-7	11.8	8.1
22	0	-1	16.0	11.9	10	0	-13	20.4	24.3	2	0	-3	54.5	57.4	15	1	-6	27.5	22.7
20	0	0	36.4	29.7	10	0	-12	37.4	40.3	2	0	-2	50.2	48.3	15	1	-5	5.9	4.3
20	0	0	5.7	2.5	10	0	-11	38.0	40.0	2	0	-1	25.9	23.5	15	1	-4	58.4	60.0
20	0	0	20.6	16.5	10	0	-10	111.5	112.2	2	0	0	30.6	36.8	15	1	-3	11.6	4.0
20	0	0	61.1	51.2	10	0	-9	14.8	14.5	2	0	0	28.2	12.3	15	1	-2	45.0	48.9
20	0	0	53.1	48.7	10	0	-8	36.2	33.5	2	0	0	172.2	173.8	15	1	-1	27.8	28.6
20	0	0	26.6	22.1	10	0	-7	87.8	80.2	2	0	0	37.5	6.1	15	1	0	96.3	101.2
20	0	0	40.3	41.0	10	0	-6	96.6	90.5	2	0	0	40.7	41.6	15	1	0	59.9	65.1
20	0	0	142.4	131.1	10	0	-5	70.0	65.8	2	0	0	46.7	49.0	15	1	0	15.2	8.5
20	0	0	36.0	32.7	10	0	-4	144.8	134.6	2	0	0	22.2	19.1	15	1	0	47.5	46.4
20	0	0	54.7	48.8	10	0	-3	36.2	40.1	2	0	0	149.1	153.7	15	1	0	26.4	15.3
20	0	0	53.0	51.2	10	0	-2	192.2	204.4	2	0	0	105.1	108.8	15	1	0	63.6	64.6
20	0	0	33.7	27.3	10	0	-1	83.1	96.1	2	0	0	182.0	185.5	15	1	0	17.9	18.7
20	0	0	10.6	5.4	10	0	0	23.1	17.9	2	0	0	14.5	5.9	15	1	0	13.7	13.2
20	0	0	16.9	13.4	10	0	1	11.3	11.5	2	0	0	105.7	113.0	15	1	0	13.3	13.2
20	0	0	€6.5	€3.5	10	0	2	246.9	265.8	2	0	0	36.7	35.9	15	1	0	22.7	19.2
20	0	0	32.9	33.0	10	0	3	108.9	125.9	2	0	0	5.6	2.9	15	1	0	28.1	26.0
20	0	0	104.6	111.4	10	0	4	26.4	18.5	2	0	0	22.2	20.8	13	1	0	37.0	30.8
20	0	0	19.7	24.3	10	0	5	111.0	115.5	2	0	0	38.1	36.2	13	1	0	94.5	84.6
20	0	0	5.9	15.9	10	0	6	79.0	27.1	2	0	0	31.9	30.3	13	1	0	51.8	53.8
20	0	0	70.5	74.5	10	0	7	56.0	59.6	2	0	0	11.4	14.0	13	1	0	12.5	10.0
20	0	0	€13	€14	10	0	8	95.9	81.8	2	0	0	91.5	88.2	13	1	0	18.8	19.2
20	0	0	6.0	5.7	10	0	9	32.1	33.2	2	0	0	101.5	99.6	13	1	0	49.9	50.3
20	0	0	12.9	18.6	10	0	10	42.3	42.9	2	0	0	5.6	3.7	13	1	0	50.9	50.3
20	0	0	112.8	111.9	10	0	11	31.9	27.1	2	0	0	79.3	81.3	13	1	0	38.5	37.8
18	0	0	35.3	34.1	10	0	12	19.4	17.8	2	0	0	133.5	136.4	13	1	0	37.7	37.0

18	C	-18	35.3	34.1	10	0	0	13	19.4	17.8	0	0	0	12	133.5	136.4	13	1	2	37.7	43.0
18	0	-17	6.4	6.5	8	8	0	15	23.9	24.6	0	0	0	11	70.5	74.4	13	1	1	39.1	42.8
18	0	-16	22.7	21.9	8	8	0	14	19.0	17.2	0	0	0	10	25.8	29.2	13	1	0	15.0	12.3
18	0	-15	55.4	55.7	8	8	0	13	29.9	25.7	0	0	0	9	81.2	88.3	13	1	-1	40.0	39.9
18	0	-14	6.1	15.2	8	8	0	12	46.4	42.4	0	0	0	8	42.4	42.0	13	1	-2	61.6	68.9
18	C	-13	109.8	113.9	8	8	0	11	18.8	8.4	0	0	0	7	312.8	297.3	13	1	-3	75.0	81.6
18	0	-12	65.9	68.6	8	8	0	10	160.3	154.1	0	0	0	6	40.3	25.9	13	1	-4	52.2	52.6
18	0	-11	90.8	92.9	8	8	0	9	68.8	70.2	0	0	0	5	38.6	20.5	13	1	-5	101.3	96.8
18	0	-10	38.2	38.1	8	8	0	8	68.0	71.2	0	0	0	4	20.0	19.2	13	1	-6	60.4	61.0
18	C	-9	177.8	178.9	8	8	0	7	68.0	71.2	0	0	0	3	20.0	19.2	13	1	-7	60.4	61.0
18	C	-8	140.5	141.2	8	8	0	6	155.5	158.2	0	0	0	2	24.9	7.8	13	1	-8	25.7	22.8
18	C	-7	57.8	57.7	8	8	0	5	62.7	67.2	0	0	0	1	27.2	25.1	13	1	-9	13.4	15.2
18	0	-6	102.9	102.0	8	8	0	4	77.5	92.1	0	0	0	0	28.5	26.4	13	1	-10	105.2	105.9
18	C	-5	15.1	15.8	8	8	0	3	81.0	88.9	0	0	0	1	17.3	19.4	13	1	-11	55.3	53.2
18	0	-4	5.8	13.9	8	8	0	2	146.9	168.1	0	0	0	1	85.6	77.1	13	1	-12	90.9	90.0
18	0	-3	47.6	43.6	8	8	0	1	121.6	141.2	0	0	0	1	21.9	15.4	13	1	-13	121.7	123.0
18	0	-2	14.0	18.9	8	8	0	0	50.4	61.2	0	0	0	1	49.1	51.0	13	1	-14	18.7	17.5
18	0	-1	19.0	11.9	8	8	0	0	48.6	57.5	0	0	0	1	16.9	17.7	13	1	-15	21.2	16.5
18	C	0	63.6	61.0	8	8	0	0	31.4	17.9	0	0	0	1	40.4	44.8	13	1	-16	29.8	23.4
18	0	1	12.3	1.0	8	8	0	0	216.3	200.7	0	0	0	1	50.9	54.2	13	1	-17	23.3	17.9
18	0	2	5.4	2.5	8	8	0	0	156.5	132.8	0	0	0	1	6.4	17.2	13	1	-18	59.0	56.0
18	0	3	21.7	21.1	8	8	0	0	24.2	22.1	0	0	0	1	40.2	46.4	13	1	-19	53.4	50.6
18	0	4	137.5	122.9	8	8	0	0	251.0	226.7	0	0	0	1	33.5	34.6	13	1	-19	28.8	30.6
18	0	5	39.1	39.7	8	8	0	0	120.3	117.7	0	0	0	1	28.8	32.5	13	1	-18	31.2	30.6
18	C	6	65.8	60.7	8	8	0	0	22.9	24.4	0	0	0	1	65.4	70.8	13	1	-17	38.5	42.4
18	C	7	5.6	7.4	8	8	0	0	11.3	6.7	0	0	0	1	6.3	6.0	13	1	-16	31.8	32.6
18	0	9	29.1	25.8	8	8	0	0	255.2	259.9	0	0	0	1	92.5	94.4	13	1	-15	40.6	40.6
18	0	8	36.3	36.3	8	8	0	0	13.0	15.6	0	0	0	1	56.3	61.5	13	1	-14	30.6	27.3
18	0	7	19.7	22.0	8	8	0	0	34.5	31.9	0	0	0	1	14.2	19.0	13	1	-13	51.4	53.6
18	0	6	39.3	35.6	8	8	0	0	10.0	1.6	0	0	0	1	6.0	7.2	13	1	-12	62.2	62.3
18	0	5	30.6	33.0	8	8	0	0	172.5	178.3	0	0	0	1	25.2	21.9	13	1	-11	17.9	22.8
18	0	4	60.0	62.4	8	8	0	0	39.5	37.4	0	0	0	1	13.7	12.9	13	1	-10	20.6	19.2
18	0	3	92.5	91.1	8	8	0	0	51.7	55.6	0	0	0	1	19.5	15.4	13	1	-9	126.4	117.0
18	0	2	24.6	12.3	8	8	0	0	92.3	91.3	0	0	0	1	47.7	42.2	13	1	-8	34.6	28.7
18	0	1	40.9	40.5	8	8	0	0	49.4	44.8	0	0	0	1	19.8	17.2	13	1	-7	85.4	85.8
18	0	0	18.5	17.3	8	8	0	0	27.7	28.8	0	0	0	1	24.3	22.2	13	1	-6	61.5	61.8
18	0	-1	41.1	44.7	8	8	0	0	104.3	104.1	0	0	0	1	6.1	15.1	13	1	-5	154.8	145.0
18	0	-2	38.0	36.3	8	8	0	0	29.0	27.4	0	0	0	1	45.8	36.0	13	1	-4	152.6	141.6
18	0	-3	294.5	269.2	8	8	0	0	20.1	21.4	0	0	0	1	13.7	10.3	13	1	-3	25.3	23.6
18	0	-4	42.7	45.3	8	8	0	0	63.8	68.1	0	0	0	1	25.2	27.5	13	1	-2	134.1	148.6
18	0	-5	6.0	1.4	8	8	0	0	15.8	7.1	0	0	0	1	25.9	25.8	13	1	0	65.3	71.1
18	0	-6	81.9	85.2	8	8	0	0	58.4	62.9	0	0	0	1	63.2	62.9	13	1	1	9.6	4.7
18	C	-7	45.4	38.3	8	8	0	0	19.6	19.8	0	0	0	1	23.2	18.1	13	1	2	76.0	90.8
18	C	-8	62.6	65.2	8	8	0	0	74.9	78.8	0	0	0	1	10.7	1.1	13	1	3	19.8	14.8
18	0	-9	21.4	26.6	8	8	0	0	12.8	3.4	0	0	0	1	56.9	55.4	13	1	4	27.4	25.8
18	0	-10	31.7	30.4	8	8	0	0	170.4	173.9	0	0	0	1	58.1	53.8	13	1	5	29.6	27.0
18	0	-11	10.6	17.7	8	8	0	0	119.8	122.8	0	0	0	1	41.5	36.8	13	1	6	44.1	46.8
18	0	-12	64.8	66.3	8	8	0	0	116.1	120.4	0	0	0	1	31.4	33.0	13	1	7	28.2	26.1
18	0	-13	64.8	65.3	8	8	0	0	53.4	54.3	0	0	0	1	20.5	21.3	13	1	8	25.1	22.9
18	0	-14	33.7	30.9	8	8	0	0	134.6	127.1	0	0	0	1	17.0	31.8	13	1	9	56.6	51.4
18	0	-15	138.6	137.4	8	8	0	0	20.6	13.5	0	0	0	1	28.0	31.8	13	1	10	28.2	26.1
18	0	-16	42.3	41.4	8	8	0	0	158.2	136.1	0	0	0	1	12.2	12.6	13	1	11	19.5	15.8
18	0	-17	64.6	60.8	8	8	0	0	459.8	343.4	0	0	0	1	14.7	19.4	13	1	12	21.0	16.0
18	0	-18	90.1	87.6	8	8	0	0	118.4	137.4	0	0	0	1	15.9	17.1	13	1	13	17.0	16.3
18	0	-19	6.4	2.3	8	8	0	0	89.0	105.9	0	0	0	1	30.1	27.7	13	1	14	48.1	43.6
18	0	-18	54.3	57.7	8	8	0	0	33.3	32.1	0	0	0	1	60.9	60.1	13	1	13	5.7	11.3
18	0	-17	48.2	48.1	8	8	0	0	159.4	161.3	0	0	0	1	10.7	11.7	13	1	12	5.6	7.5
18	0	-16	6.3	5.8	8	8	0	0	61.0	68.0	0	0	0	1	6.1	7.7	13	1	11	11.0	11.0
18	C	-15	40.6	37.7	8	8	0	0	71.9	71.9	0	0	0	1	6.1	6.7	13	1	10	14.0	14.0
18	0	-14	106.7	102.7	8	8	0	0	14.6	5.3	0	0	0	1	14.1	13.6	13	1	9	42.1	38.6
18	0	-13	23.6	18.6	8	8	0	0	28.2	33.4	0	0	0	1	32.5	31.6	13	1	8	22.1	21.7
18	0	-12	63.0	61.8	8	8	0	0	105.6	111.5	0	0	0	1	90.1	93.5	13	1	7	13.3	9.3
18	0	-11	84.0	83.2	8	8	0	0	113.6	116.5	0	0	0	1	38.8	36.6	13	1	6	90.1	59.1
18	C	-10	30.4	21.6	8	8	0	0	38.7	41.9	0	0	0	1	65.3	68.7	13	1	5	39.1	44.1
18	0	-9	20.2	24.7	8	8	0	0	105.5	105.2	0	0	0	1	21.8	24.5	13	1	4	42.6	45.4

14	0	-7	59.5	101.1	6	0	11	90.9	90.2	19	1	-11	10.7	7.7	9	1	3	9.7	5.6
14	0	-7	40.8	39.8	6	0	12	33.7	37.0	19	1	-10	6.0	2.4	9	1	2	49.1	56.5
14	0	-6	105.3	100.1	6	0	13	91.4	83.6	19	1	-9	5.9	8.5	9	1	1	63.5	72.1
14	0	-4	31.0	28.9	6	0	14	55.8	54.4	19	1	-8	10.7	10.2	9	1	0	148.7	169.1
14	0	-4	17.2	14.4	6	0	15	87.1	82.4	19	1	-7	66.5	67.9	9	1	0	68.6	80.0
14	0	-3	82.3	66.6	6	0	16	14.1	10.9	19	1	-6	12.0	15.3	9	1	-2	25.2	17.5
14	0	-2	171.2	178.6	4	0	15	60.3	56.4	19	1	-5	14.2	3.8	9	1	-4	21.1	7.2
14	0	0	24.3	26.4	4	0	14	42.1	43.1	19	1	-4	12.4	10.8	9	1	-3	86.7	78.2
14	0	0	47.8	53.0	4	0	14	73.7	65.9	19	1	-3	95.0	93.0	9	1	-5	61.0	55.7
14	0	1	158.5	163.3	4	0	13	71.9	70.0	19	1	-2	17.7	12.6	9	1	-6	155.3	147.2
14	0	2	80.6	83.9	4	0	12	68.6	63.0	19	1	-1	35.1	31.3	9	1	-7	88.9	85.2
14	0	3	15.6	15.9	4	0	11	39.6	38.7	19	1	0	36.5	35.5	9	1	-8	30.4	26.2
14	0	4	23.3	6.6	4	0	10	65.8	69.3	19	1	1	25.2	23.8	9	1	-9	154.4	156.0
14	0	5	56.6	60.7	4	0	9	37.1	39.3	19	1	2	35.3	36.6	9	1	-10	84.2	89.0
14	0	6	25.1	25.7	4	0	8	57.7	56.9	19	1	3	30.5	29.9	9	1	-11	19.6	19.3
14	0	7	46.4	44.0	4	0	7	26.8	25.0	19	1	4	66.6	64.0	9	1	-12	94.5	96.3
14	0	8	90.4	82.8	4	0	6	192.4	201.5	19	1	5	67.8	59.0	9	1	-13	25.6	23.6
14	0	9	26.9	27.3	4	0	5	143.7	157.3	19	1	6	5.7	0.7	9	1	-14	48.3	48.0
14	0	10	32.9	26.5	4	0	4	162.4	174.7	17	1	6	67.8	57.6	9	1	-15	88.4	89.0
14	0	11	5.5	4.6	4	0	3	456.2	398.3	17	1	7	11.1	7.5	9	1	-16	20.5	19.0
12	0	12	22.9	25.7	4	0	2	48.8	42.6	17	1	6	37.2	34.8	9	1	-17	42.8	45.3
12	0	11	29.4	19.4	4	0	1	40.4	35.4	17	1	5	41.6	36.8	9	1	-18	6.2	10.2
12	0	10	5.4	10.5	4	0	0	25.6	31.2	17	1	4	5.5	9.4	9	1	-19	30.2	30.6
12	0	9	86.4	87.3	4	0	0	91.1	93.6	17	1	3	17.0	10.7	7	1	-19	47.6	50.6
12	0	8	46.7	41.4	4	0	0	197.5	161.0	17	1	2	18.5	16.2	7	1	-18	69.4	71.4
12	0	7	11.1	1.8	4	0	0	59.4	52.7	17	1	1	61.4	59.5	7	1	-17	10.5	8.6

H	K	L	FC	FC	H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FC	FC
7	1	-16	29.1	29.2	24	2	-11	35.2	36.1	12	2	-11	28.9	28.8					
7	1	-15	31.4	33.4	24	2	-12	6.3	17.7	12	2	-12	41.0	42.3					
7	1	-14	5.7	8.5	24	2	-12	46.3	52.5	12	2	-13	98.5	102.2					
7	1	-13	53.5	47.9	22	2	-15	78.3	81.5	12	2	-14	98.7	97.6					
7	1	-12	19.2	12.2	22	2	-14	15.0	19.0	12	2	-15	44.2	45.6					
7	1	-11	45.8	45.5	22	2	-13	43.7	46.2	12	2	-16	109.4	107.9					
7	1	-10	128.1	137.2	22	2	-12	43.2	45.5	12	2	-17	92.7	92.1					
7	1	-9	144.8	169.7	22	2	-11	23.4	27.1	12	2	-18	36.4	37.0					
7	1	-8	54.3	54.6	22	2	-10	15.5	12.5	12	2	-19	78.9	74.5					
7	1	-7	28.5	29.5	22	2	-9	64.4	67.5	10	2	-19	11.7	9.1					
7	1	-6	158.8	191.8	22	2	-8	23.2	29.4	10	2	-18	16.4	13.5					
7	1	-5	123.6	118.0	22	2	-7	26.5	23.0	10	2	-17	52.9	51.7					
7	1	-4	144.8	154.1	22	2	-6	35.2	34.3	10	2	-16	5.0	3.7					
7	1	-3	76.4	69.0	22	2	-5	6.2	1.1	10	2	-15	17.0	3.7					
7	1	-2	57.7	52.3	22	2	-4	16.0	13.2	10	2	-14	31.4	34.8					
7	1	-1	53.2	112.9	22	2	-3	74.6	59.1	10	2	-13	32.2	32.3					
7	1	0	56.6	71.3	22	2	-2	51.4	45.4	10	2	-12	118.9	118.5					
7	1	1	49.4	51.7	22	2	-1	41.1	36.4	10	2	-11	25.1	27.3					
7	1	2	72.3	41.7	22	2	0	16.0	14.5	10	2	-10	30.9	33.1					
7	1	3	116.1	134.9	22	2	1	43.3	37.4	10	2	-9	114.9	114.8					
7	1	4	95.2	103.4	22	2	2	11.7	6.5	10	2	-8	40.7	39.1					
7	1	5	45.2	52.0	20	2	3	22.8	13.7	10	2	-7	46.9	47.5					
7	1	6	164.4	171.8	20	2	4	60.1	54.0	10	2	-6	113.0	112.2					
7	1	7	14.7	16.5	20	2	5	22.8	47.4	10	2	-5	70.1	65.9					
7	1	8	33.8	30.8	20	2	6	87.7	81.9	10	2	-4	45.1	39.4					
7	1	9	15.6	3.7	20	2	7	78.8	76.3	10	2	-3	32.5	15.0					
7	1	10	32.0	32.8	20	2	8	29.9	15.5	10	2	-2	138.6	160.4					
7	1	11	56.4	57.3	20	2	9	11.2	4.5	10	2	-1	77.5	91.8					
7	1	12	24.0	23.3	20	2	10	34.9	25.8	10	2	0	45.6	54.9					
7	1	13	30.1	28.6	20	2	11	72.4	67.7	10	2	1	146.0	166.8					
7	1	14	14.9	13.7	20	2	12	55.3	53.0	10	2	2	40.0	37.1					
7	1	15	21.9	20.4	20	2	13	23.1	23.3	10	2	3	101.9	113.1					
5	1	16	37.0	36.0	20	2	14	157.5	157.5	10	2	4	5.2	2.3					
5	1	15	42.3	39.5	20	2	15	25.7	26.4	10	2	5	90.5	92.7					
5	1	14	5.6	3.4	20	2	16	6.0	1.8	10	2	6	70.3	68.4					
5	1	13	19.0	24.0	20	2	17	73.2	76.1	10	2	7	85.5	88.8					
5	1	12	54.7	59.6	20	2	18	63.0	63.3	10	2	8	5.5	5.4					
5	1	11	64.5	71.2	20	2	19	36.6	37.0	10	2	9	5.4	1.5					
5	1	10	29.2	26.9	20	2	20	6.0	2.6	10	2	10	59.2	7.3					
5	1	9	27.7	26.9	20	2	21	39.1	35.7	10	2	11	14.1	51.7					
5	1	8	43.2	44.6	20	2	22	12.3	1.6	10	2	12	60.5	60.7					
5	1	7	57.1	57.0	20	2	23	65.7	67.1	8	2	13	19.1	12.4					
5	1	6	53.1	57.6	20	2	24	23.5	26.7	8	2	14	115.0	104.7					
5	1	5	44.7	43.1	18	2	25	12.7	16.5	8	2	15	29.9	33.4					
5	1	4	79.2	44.3	18	2	26	70.4	72.0	8	2	16	38.3	41.0					
5	1	3	106.0	120.9	18	2	27	11.7	16.9	8	2	17	70.5	69.8					
5	1	2	129.8	147.4	18	2	28	34.8	33.1	8	2	18	18.7	14.0					
5	1	1	147.4	147.4	18	2	29	70.4	72.0	8	2	19	19.5	22.3					
5	1	0	147.4	147.4	18	2	30	34.8	33.1	8	2	20	37.8	38.4					
5	1	-1	147.4	147.4	18	2	31	25.2	27.6	8	2	21	11.7	14.0					
5	1	-2	36.0	33.7	18	2	32	66.1	72.4	8	2	22	15.9	3.5					
5	1	-3	65.3	60.5	18	2	33	52.6	55.8	8	2	23	89.6	89.9					
5	1	-4	132.0	128.5	18	2	34	49.7	52.0	8	2	24	191.3	214.9					
5	1	-5	26.3	24.5	18	2	35	80.8	81.2	8	2	25	20.0	21.7					
5	1	-6	10.6	10.4	18	2	36	34.3	35.3	8	2	26	81.5	96.8					
5	1	-7	33.6	33.4	18	2	37	127.5	125.8	8	2	27	244.3	269.9					
5	1	-8	41.4	40.3	18	2	38	70.0	72.6	8	2	28	92.5	107.2					
5	1	-9	39.0	35.3	18	2	39	57.8	59.6	8	2	29	131.9	142.4					
5	1	-10	47.7	51.7	18	2	40	26.9	12.5	8	2	30							

5	1	-10	47.7	51.7	18	2	-3	26.9	12.5	8	2	-2	131.9	142.4
5	1	-11	40.5	43.0	18	2	-2	61.5	60.3	8	2	-3	109.2	107.5
5	1	-12	19.5	14.5	18	2	0	26.4	28.3	8	2	-4	208.0	185.2
5	1	-13	66.9	71.3	18	2	1	15.5	17.3	8	2	-5	68.2	65.4
5	1	-14	36.9	43.6	18	2	1	77.9	76.1	8	2	-6	45.6	40.6
5	1	-15	118.6	120.9	18	2	2	17.2	1.8	8	2	-7	313.4	294.3
5	1	-16	27.1	23.5	18	2	3	16.2	16.6	8	2	-8	203.6	202.8
5	1	-17	33.4	33.7	18	2	4	37.7	31.4	8	2	-9	37.1	39.7
5	1	-18	60.7	58.8	18	2	5	60.4	55.5	8	2	-10	18.5	3.2
5	1	-19	40.5	40.4	18	2	6	38.7	37.2	8	2	-11	11.9	6.7
3	1	-18	52.8	52.5	18	2	7	27.8	18.6	8	2	-12	20.7	19.0
3	1	-17	22.5	20.8	16	2	5	50.9	45.7	8	2	-13	165.3	175.7
3	1	-16	27.8	32.7	16	2	8	42.7	42.7	8	2	-14	30.3	36.3
3	1	-15	14.8	8.1	16	2	7	23.5	21.4	8	2	-15	19.7	12.9
3	1	-14	46.0	101.5	16	2	6	73.1	76.1	8	2	-16	89.2	90.3
3	1	-13	5.5	4.5	16	2	5	24.6	16.7	8	2	-17	37.9	44.2
3	1	-12	28.0	30.8	16	2	4	13.9	3.3	8	2	-18	46.8	44.2
3	1	-11	35.8	38.2	16	2	3	63.3	61.8	8	2	-19	40.7	36.1
3	1	-10	56.7	56.7	16	2	2	50.7	52.1	6	2	-19	62.8	63.8
3	1	-9	62.8	64.0	16	2	1	12.8	9.0	6	2	-18	27.2	26.6
3	1	-8	44.1	42.7	16	2	0	36.2	32.7	6	2	-17	5.9	2.4
3	1	-7	20.6	16.4	16	2	-1	156.8	162.4	6	2	-16	56.3	61.2
3	1	-6	35.5	35.3	16	2	-2	40.1	44.1	6	2	-15	69.2	67.9
3	1	-5	30.1	27.6	16	2	-3	156.8	165.2	6	2	-14	13.0	3.6
3	1	-4	275.9	218.7	16	2	-4	31.0	13.5	6	2	-13	15.8	20.2
3	1	-3	24.7	18.7	16	2	-5	22.0	20.7	6	2	-12	113.8	119.7
3	1	-2	16.4	23.1	16	2	-6	92.4	93.8	6	2	-11	45.2	41.2
3	1	-1	35.3	40.4	16	2	-7	48.6	43.3	6	2	-10	55.0	54.7
3	1	0	64.5	90.7	16	2	-8	28.8	31.2	6	2	-9	132.1	138.4
3	1	1	51.7	57.2	16	2	-9	78.7	82.5	6	2	-8	95.1	96.9
3	1	2	46.9	40.4	16	2	-10	125.5	127.2	6	2	-7	24.4	22.8
3	1	3	122.7	183.6	16	2	-11	77.7	76.9	6	2	-6	37.3	39.2
3	1	4	56.5	56.3	16	2	-12	5.8	6.5	6	2	-5	300.9	278.7
3	1	5	47.7	44.7	16	2	-13	108.4	112.6	6	2	-4	176.0	162.0
3	1	6	57.6	58.9	16	2	-14	94.0	92.3	6	2	-5	289.1	278.7
3	1	7	73.1	77.6	16	2	-15	6.3	9.2	6	2	-4	171.7	162.0
3	1	8	93.7	105.0	16	2	-16	47.1	47.7	6	2	-3	77.8	70.0
3	1	9	158.7	167.6	16	2	-17	65.7	66.4	6	2	-2	90.1	89.1
3	1	10	14.2	6.3	16	2	-18	31.5	27.3	6	2	-1	99.6	114.5
3	1	11	62.7	67.4	14	2	-15	6.6	10.5	6	2	0	25.9	20.5
3	1	12	64.8	65.3	14	2	-18	13.0	30.9	6	2	1	125.7	150.6
3	1	13	13.4	4.0	14	2	-17	34.1	15.3	6	2	2	71.3	75.4
3	1	14	5.7	4.1	14	2	-16	12.2	8.3	6	2	3	134.5	146.2
3	1	15	38.8	38.7	14	2	-15	84.2	85.3	6	2	4	87.8	100.4
3	1	16	5.7	5.0	14	2	-14	23.9	20.3	6	2	5	132.0	147.8
3	1	17	13.0	4.7	14	2	-13	73.8	70.4	6	2	6	43.8	46.3
3	1	17	59.3	55.3	14	2	-12	26.1	25.1	6	2	7	71.6	72.2
1	1	16	5.9	15.6	14	2	-11	75.2	73.3	6	2	8	93.6	101.7
1	1	15	27.5	25.6	14	2	-10	24.3	26.3	6	2	9	54.5	58.5
1	1	14	134.0	133.7	14	2	-9	172.5	173.9	6	2	10	131.9	131.6
1	1	13	21.9	16.4	14	2	-8	69.2	72.4	6	2	11	25.8	23.8
1	1	12	19.5	18.2	14	2	-7	35.6	34.4	6	2	11	24.1	18.9
1	1	11	27.5	29.9	14	2	-6	70.2	69.9	6	2	13	28.5	23.0
1	1	10	73.8	75.5	14	2	-5	36.8	33.9	6	2	14	51.2	48.2
1	1	9	29.1	28.1	14	2	-4	132.5	137.2	6	2	15	43.2	40.6
1	1	8	118.1	127.8	14	2	-3	20.9	18.4	6	2	16	36.2	37.3
1	1	7	42.0	41.3	14	2	-2	13.7	14.8	6	2	15	32.3	30.4
1	1	6	57.4	49.6	14	2	-1	61.2	67.4	6	2	13	17.3	7.5
1	1	5	158.1	163.6	14	2	0	28.8	18.9	6	2	12	100.3	97.3
1	1	4	78.7	87.5	14	2	1	120.8	130.7	6	2	12	43.6	44.1
1	1	3	19.1	2.9	14	2	2	22.4	14.2	6	2	11	10.1	10.1
1	1	2	47.7	47.9	14	2	3	41.3	41.9	6	2	10	81.6	84.1
1	1	1	18.7	18.4	14	2	4	16.9	7.7	6	2	9	33.1	34.1
1	1	0	35.2	42.9	14	2	5	81.8	83.9	6	2	8	13.2	2.6
1	1	-1	23.4	25.4	14	2	6	20.7	13.6	6	2	7	119.1	131.4
1	1	-2	41.7	41.7	14	2	7	18.8	14.8	6	2	6	131.0	144.3
1	1	-3	31.0	41.7	14	2	8	18.8	14.8	6	2	5	163.8	180.0

1	1	3	37.0	41.7	14	2	8	18.8	14.8	4	2	5	163.8	180.0
1	1	-4	254.7	247.2	14	2	5	5.5	3.5	4	2	4	42.1	41.7
1	1	-5	45.6	43.5	14	2	10	16.6	9.2	4	2	3	45.5	37.5
1	1	-6	143.6	148.4	12	2	12	58.4	54.6	4	2	2	60.1	66.5
1	1	-7	114.1	118.8	12	2	11	22.0	15.0	4	2	2	129.4	146.6
1	1	-8	31.9	22.3	12	2	10	65.2	63.3	4	2	1	290.6	338.7
1	1	-9	106.9	111.7	12	2	9	36.8	32.0	4	2	0	172.8	183.7
1	1	-10	62.3	67.1	12	2	8	38.3	31.2	4	2	-1	118.0	112.0
1	1	-11	41.8	42.9	12	2	7	97.7	95.5	4	2	-2	167.4	161.8
1	1	-12	20.7	17.8	12	2	6	46.2	45.6	4	2	-4	28.0	20.5
1	1	-13	62.0	62.3	12	2	5	78.3	79.2	4	2	-5	83.0	82.7
1	1	-14	24.2	28.4	12	2	4	34.5	33.7	4	2	-6	73.2	78.3
1	1	-15	18.2	21.2	12	2	3	176.5	192.8	4	2	-7	192.8	202.7
1	1	-16	68.7	66.5	12	2	2	27.8	32.4	4	2	-8	96.2	101.5
1	1	-17	16.5	16.2	12	2	1	90.1	95.2	4	2	-9	25.8	21.6
1	1	-18	43.9	42.3	12	2	0	21.2	8.8	4	2	-10	93.6	96.6
24	24	-1	72.6	62.9	12	2	-1	97.9	112.8	4	2	-11	106.9	114.3
24	24	-2	20.0	14.9	12	2	-2	95.6	107.3	4	2	-12	59.5	62.0
24	24	-3	59.3	52.4	12	2	-3	42.2	47.6	4	2	-13	46.1	47.6
24	24	-4	70.8	63.4	12	2	-4	277.6	257.0	4	2	-14	55.3	55.9
24	24	-5	34.9	33.6	12	2	-5	24.3	13.1	4	2	-15	43.7	44.4
24	24	-6	26.2	22.3	12	2	-6	32.2	33.0	4	2	-16	41.9	42.5
24	24	-7	51.9	48.8	12	2	-7	109.3	106.7	4	2	-17	18.3	19.7
24	24	-8	35.6	38.2	12	2	-8	67.7	69.2	4	2	-18	31.5	30.8
24	24	-9	48.9	48.5	12	2	-9	229.8	224.5	2	2	-18	81.9	79.7
24	24	-10	6.2	0.9	12	2	-10	124.6	124.9	2	2	-17	5.8	10.6

H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
2	2	-16	31.2	33.7	15	3	-1	26.6	30.0	5	3	2	76.3	85.3	16	4	-8	22.3	10.5	16	4	-8	22.3	10.5
2	2	-15	57.5	57.9	15	3	0	27.7	29.5	5	3	1	129.1	150.5	16	4	-7	108.5	110.6	16	4	-7	108.5	110.6
2	2	-14	33.1	31.9	15	3	1	63.6	67.3	5	3	0	87.6	110.8	16	4	-6	15.8	13.0	16	4	-6	15.8	13.0
2	2	-13	40.0	39.9	15	3	2	41.8	41.3	5	3	-1	21.2	13.5	16	4	-5	29.2	29.0	16	4	-5	29.2	29.0
2	2	-12	42.6	28.1	15	3	3	29.5	27.3	5	3	-2	89.2	84.1	16	4	-4	183.0	180.7	16	4	-4	183.0	180.7
2	2	-11	118.1	125.9	15	3	4	28.9	24.2	5	3	-3	238.4	207.9	16	4	-3	23.4	21.5	16	4	-3	23.4	21.5
2	2	-10	162.6	171.1	15	3	5	56.4	56.9	5	3	-4	156.8	152.6	16	4	-2	38.9	39.1	16	4	-2	38.9	39.1
2	2	-9	91.8	98.0	15	3	6	5.4	1.7	5	3	-5	17.0	15.0	16	4	-1	19.5	21.4	16	4	-1	19.5	21.4
2	2	-8	59.2	62.6	15	3	7	12.6	10.9	5	3	-6	144.8	147.1	16	4	0	67.3	71.3	16	4	0	67.3	71.3
2	2	-7	75.5	75.2	15	3	8	30.9	16.9	5	3	-7	44.7	45.2	16	4	1	27.5	19.9	16	4	1	27.5	19.9
2	2	-6	36.9	37.4	15	3	9	38.9	35.3	5	3	-8	56.6	60.1	16	4	2	19.5	19.9	16	4	2	19.5	19.9
2	2	-5	24.7	6.0	13	3	10	97.6	85.3	5	3	-9	46.0	47.6	16	4	3	68.7	70.2	16	4	3	68.7	70.2
2	2	-4	17.9	10.5	13	3	11	38.9	35.3	5	3	-10	121.2	124.5	16	4	4	31.3	31.9	16	4	4	31.3	31.9
2	2	-3	145.6	148.7	13	3	12	49.8	49.8	5	3	-11	78.9	82.4	16	4	5	5.4	5.4	16	4	5	5.4	5.4
2	2	-2	120.4	123.7	13	3	13	19.2	17.6	5	3	-12	50.8	53.7	16	4	6	41.8	35.4	16	4	6	41.8	35.4
2	2	-1	34.6	32.7	13	3	14	51.4	45.8	5	3	-13	81.5	85.0	16	4	7	19.3	19.1	16	4	7	19.3	19.1
2	2	0	137.3	181.8	13	3	15	42.1	43.8	5	3	-14	45.1	43.7	16	4	8	22.8	23.4	16	4	8	22.8	23.4
2	2	1	51.4	50.1	13	3	16	63.1	63.4	5	3	-15	82.1	85.2	16	4	9	73.7	69.0	16	4	9	73.7	69.0
2	2	2	180.8	194.4	13	3	17	48.6	51.3	5	3	-16	5.8	11.9	16	4	10	14.7	9.2	16	4	10	14.7	9.2
2	2	3	40.9	36.1	13	3	18	39.8	43.7	5	3	-17	28.9	27.0	16	4	11	40.6	43.6	16	4	11	40.6	43.6
2	2	4	37.7	34.8	13	3	19	18.9	17.1	5	3	-18	47.0	49.4	16	4	12	10.0	11.3	16	4	12	10.0	11.3
2	2	5	318.2	311.2	13	3	20	86.1	95.2	5	3	-19	15.2	6.4	16	4	13	15.1	7.4	16	4	13	15.1	7.4
2	2	6	118.6	130.8	13	3	21	45.8	48.7	5	3	-20	20.5	22.8	16	4	14	70.4	76.1	16	4	14	70.4	76.1
2	2	7	23.5	12.9	13	3	22	42.8	45.0	5	3	-21	5.7	9.0	16	4	15	23.0	26.8	16	4	15	23.0	26.8
2	2	8	43.4	50.1	13	3	23	89.3	97.2	5	3	-22	32.3	32.2	16	4	16	101.6	108.2	16	4	16	101.6	108.2
2	2	9	72.3	74.2	13	3	24	85.6	96.6	5	3	-23	20.5	22.8	16	4	17	14.7	13.4	16	4	17	14.7	13.4
2	2	10	56.5	58.8	13	3	25	5.6	4.1	5	3	-24	27.7	26.7	16	4	18	11.7	5.1	16	4	18	11.7	5.1
2	2	11	46.7	50.2	13	3	26	60.4	61.0	5	3	-25	43.5	42.2	16	4	19	41.3	46.5	16	4	19	41.3	46.5
2	2	12	46.7	42.3	13	3	27	16.7	7.1	5	3	-26	43.5	39.5	16	4	20	29.7	32.2	16	4	20	29.7	32.2
2	2	13	36.7	42.3	13	3	28	15.4	5.8	5	3	-27	36.5	41.8	16	4	21	50.9	54.8	16	4	21	50.9	54.8
2	2	14	35.9	33.5	13	3	29	19.9	14.0	5	3	-28	25.4	16.1	16	4	22	52.8	54.7	16	4	22	52.8	54.7
2	2	15	29.2	31.5	13	3	30	35.7	37.1	5	3	-29	105.3	113.5	16	4	23	26.4	25.0	16	4	23	26.4	25.0
2	2	16	45.7	45.0	13	3	31	21.1	20.6	5	3	-30	101.4	104.4	16	4	24	47.1	51.3	16	4	24	47.1	51.3
2	2	17	45.7	45.0	13	3	32	58.4	58.4	5	3	-31	101.4	104.4	16	4	25	41.5	40.5	16	4	25	41.5	40.5
2	2	18	66.9	65.9	13	3	33	78.5	78.9	5	3	-32	138.0	121.4	16	4	26	69.6	69.4	16	4	26	69.6	69.4
2	2	19	35.7	35.6	13	3	34	49.1	52.8	5	3	-33	101.4	104.4	16	4	27	41.5	40.5	16	4	27	41.5	40.5
2	2	20	105.6	105.7	13	3	35	15.3	10.1	5	3	-34	26.8	24.5	16	4	28	59.2	56.6	16	4	28	59.2	56.6
2	2	21	64.8	66.3	13	3	36	23.7	20.1	5	3	-35	83.8	83.8	16	4	29	88.6	88.6	16	4	29	88.6	88.6
2	2	22	17.1	12.0	13	3	37	29.5	30.8	5	3	-36	36.3	40.4	16	4	30	59.2	56.6	16	4	30	59.2	56.6
2	2	23	230.3	236.4	13	3	38	84.7	80.3	5	3	-37	98.9	106.4	16	4	31	15.1	12.2	16	4	31	15.1	12.2
2	2	24	68.1	70.8	11	3	39	37.9	42.1	5	3	-38	83.9	93.7	16	4	32	6.5	3.0	16	4	32	6.5	3.0
2	2	25	17.2	15.0	11	3	40	52.9	55.9	5	3	-39	102.2	105.8	16	4	33	36.6	36.0	16	4	33	36.6	36.0
2	2	26	51.3	49.5	11	3	41	55.3	58.9	5	3	-40	41.7	41.5	16	4	34	36.6	33.5	16	4	34	36.6	33.5
2	2	27	165.9	175.4	11	3	42	30.4	30.4	5	3	-41	63.6	69.2	16	4	35	6.3	10.6	16	4	35	6.3	10.6
2	2	28	135.9	140.1	11	3	43	10.9	12.8	5	3	-42	68.2	70.4	16	4	36	49.5	48.3	16	4	36	49.5	48.3
2	2	29	45.3	35.8	11	3	44	69.4	71.1	5	3	-43	125.6	133.8	16	4	37	27.6	27.6	16	4	37	27.6	27.6
2	2	30	283.7	275.7	11	3	45	74.0	73.6	5	3	-44	161.8	169.1	16	4	38	50.5	50.5	16	4	38	50.5	50.5
2	2	31	76.8	81.4	11	3	46	5.8	1.5	5	3	-45	40.7	44.4	16	4	39	35.4	35.4	16	4	39	35.4	35.4
2	2	32	131.7	137.4	11	3	47	149.7	142.7	5	3	-46	64.2	67.8	16	4	40	43.9	43.9	16	4	40	43.9	43.9
2	2	33	45.1	45.4	11	3	48	35.3	35.0	5	3	-47	49.0	48.3	16	4	41	87.2	83.2	16	4	41	87.2	83.2
2	2	34	17.6	23.5	11	3	49	139.1	136.2	5	3	-48	16.0	11.4	16	4	42	130.7	130.7	16	4	42	130.7	130.7
2	2	35	76.8	79.7	11	3	50	79.1	80.7	5	3	-49	34.2	35.9	16	4	43	90.8	87.6	16	4	43	90.8	87.6
2	2	36	6.4	6.0	11	3	51	139.5	136.4	5	3	-50	5.6	6.8	16	4	44	130.8	130.3	16	4	44	130.8	130.3
2	2	37	75.3	80.3	11	3	52	15.4	15.4	5	3	-51	37.9	34.0	16	4	45	47.5	47.5	16	4	45	47.5	47.5
2	2	38	52.8	59.6	11	3	53	32.5	25.8	5	3	-52	24.5	25.0	16	4	46	15.4	10.3	16	4	46	15.4	10.3
2	2	39	22.3	27.4	11	3	54	107.9	107.9	5	3	-53	5.6	7.7	16	4	47	12.0	12.0	16	4	47	12.0	12.0
2	2	40	23.2	23.8	11	3	55	160.6	185.3	5	3	-54	80.0	79.1	16	4	48	98.3	106.9	16	4	48	98.3	106.9



23	3	-7	23.2	23.8	11	11	11	160.6	185.3	1	1	3	13	80.0	79.1	12	12	51.8	55.5
23	3	-6	47.6	40.5	11	11	37.1	45.9	1	1	3	12	5.5	3.1	12	12	38.2	41.1	
23	3	-5	15.2	2.5	11	11	99.5	118.3	1	1	3	11	37.5	37.0	12	12	164.2	183.8	
23	3	-4	28.3	26.6	11	11	44.5	46.5	1	1	3	10	5.2	15.8	12	12	64.5	68.1	
23	3	-3	11.6	9.0	11	11	32.0	36.1	1	1	3	9	18.6	18.2	12	12	18.7	14.3	
23	3	-2	10.7	6.3	11	11	34.8	34.7	1	1	3	8	32.6	37.2	12	12	13.5	12.1	
23	3	-1	6.0	6.8	11	11	93.2	103.5	1	1	3	7	27.3	25.7	12	12	36.4	37.3	
23	3	0	6.0	6.2	11	11	52.9	51.9	1	1	3	6	23.1	17.3	12	12	100.3	101.2	
21	3	3	19.2	16.0	11	11	58.5	55.3	1	1	3	5	26.7	9.8	12	12	16.5	7.6	
21	3	2	15.4	9.5	11	11	36.7	40.9	1	1	3	4	61.1	117.6	12	12	35.9	35.6	
21	3	1	72.1	€3.3	11	11	68.1	64.8	1	1	3	3	78.9	82.4	12	12	22.5	17.9	
21	3	0	5.8	3.5	11	11	5.6	2.0	1	1	3	2	61.1	64.1	12	12	58.0	58.8	
21	3	-1	13.7	9.3	11	11	24.4	21.7	1	1	3	1	48.2	52.5	10	10	22.5	17.9	
21	3	-2	48.6	45.0	9	9	5.7	6.8	1	1	3	0	14.8	16.3	10	10	13.6	12.5	
21	3	-3	46.0	45.0	9	9	30.5	30.5	1	1	3	-2	24.7	28.3	10	10	24.3	25.0	
21	3	-4	37.3	34.3	9	9	13.8	11.6	1	1	3	-3	121.9	123.2	10	10	31.2	30.3	
21	3	-5	18.5	16.7	9	9	35.6	29.9	1	1	3	-4	218.9	223.6	10	10	18.1	12.5	
21	3	-6	6.2	10.6	9	9	26.8	23.1	1	1	3	-5	57.8	57.3	10	10	15.1	9.2	
21	3	-7	5.9	2.4	9	9	5.4	3.8	1	1	3	-6	115.5	118.1	10	10	15.2	14.5	
21	3	-8	45.8	44.7	9	9	12.2	12.4	1	1	3	-7	30.7	32.1	10	10	76.8	82.1	
21	3	-9	17.3	17.1	9	9	122.8	128.8	1	1	3	-8	61.6	58.5	10	10	28.2	21.9	
21	3	-10	5.8	6.5	9	9	37.1	39.9	1	1	3	-9	102.9	107.4	10	10	56.1	62.0	
21	3	-11	10.3	8.0	9	9	42.9	46.3	1	1	3	-10	15.5	15.3	10	10	162.2	185.3	
21	3	-12	27.7	28.9	9	9	55.9	61.3	1	1	3	-11	28.6	28.8	10	10	32.4	40.2	
21	3	-13	11.9	12.3	9	9	36.4	41.9	1	1	3	-12	70.6	70.4	10	10	10.2	4.4	
21	3	-14	15.8	18.7	9	9	5.0	9.3	1	1	3	-13	19.3	22.1	10	10	96.6	97.5	
21	3	-15	30.2	28.5	9	9	110.8	129.5	1	1	3	-14	70.6	70.4	10	10	89.6	97.5	
19	3	-16	6.2	4.8	9	9	31.2	36.9	1	1	3	-15	13.7	12.1	10	10	21.3	17.4	
19	3	-17	58.3	64.7	9	9	71.4	75.3	1	1	3	-16	22.8	23.8	10	10	79.2	75.4	
19	3	-18	13.8	15.4	9	9	21.7	10.8	1	1	3	-17	22.8	23.2	10	10	84.0	81.9	
19	3	-19	57.4	61.4	9	9	41.0	35.8	1	1	3	-18	13.6	8.9	10	10	94.0	90.6	
19	3	-20	5.9	5.6	9	9	52.1	47.0	1	1	3	-19	6.0	2.6	10	10	63.3	57.7	
19	3	-21	35.9	35.1	9	9	18.9	14.6	1	1	3	-20	43.0	41.1	10	10	55.5	55.1	
19	3	-22	12.0	8.6	9	9	46.4	45.1	1	1	3	-21	45.9	43.9	10	10	5.7	6.6	
19	3	-23	32.8	34.1	9	9	44.5	43.9	1	1	3	-22	55.7	47.6	10	10	71.0	67.3	
19	3	-24	5.8	2.6	9	9	75.9	77.9	1	1	3	-23	62.4	64.2	10	10	18.0	14.0	
19	3	-25	81.7	16.3	9	9	39.7	41.1	1	1	3	-24	18.4	18.4	10	10	22.2	25.2	
19	3	-26	6.2	16.3	9	9	61.6	61.6	1	1	3	-25	11.1	7.7	10	10	31.1	32.0	
19	3	-27	25.3	27.2	9	9	10.3	1.1	1	1	3	-26	52.8	56.5	10	10	78.0	77.8	
19	3	-28	17.5	15.7	9	9	25.6	24.0	1	1	3	-27	6.0	3.9	10	10	26.9	24.6	
19	3	-29	36.4	38.1	9	9	87.1	84.2	1	1	3	-28	18.5	18.3	10	10	6.1	6.5	
19	3	-30	22.9	16.0	9	9	36.4	36.9	1	1	3	-29	58.5	61.5	10	10	34.6	35.7	
19	3	-31	15.6	3.5	9	9	38.9	40.3	1	1	3	-30	95.3	99.8	10	10	48.7	46.6	
19	3	-32	14.5	4.2	9	9	6.1	6.8	1	1	3	-31	6.0	2.0	10	10	88.7	86.6	
19	3	-33	20.3	15.8	9	9	23.9	22.9	1	1	3	-32	26.0	27.0	10	10	30.7	31.9	
19	3	-34	25.3	23.8	9	9	24.5	26.7	1	1	3	-33	59.9	63.1	10	10	18.4	12.0	
19	3	-35	28.0	27.2	9	9	65.5	68.6	1	1	3	-34	6.0	5.7	10	10	121.9	127.3	
19	3	-36	41.2	41.0	9	9	52.6	53.4	1	1	3	-35	74.8	75.7	10	10	11.7	7.0	
19	3	-37	58.0	50.7	9	9	10.5	4.0	1	1	3	-36	11.7	7.2	10	10	15.2	10.8	
19	3	-38	47.0	42.7	9	9	43.1	40.5	1	1	3	-37	29.7	33.1	10	10	40.4	41.1	
19	3	-39	11.6	10.1	9	9	51.8	53.1	1	1	3	-38	27.9	29.5	10	10	197.9	199.7	
19	3	-40	67.6	61.5	9	9	28.3	105.1	1	1	3	-39	44.4	38.9	10	10	92.6	93.1	
19	3	-41	5.4	13.1	9	9	142.6	150.9	1	1	3	-40	21.3	13.0	10	10	24.1	23.8	
19	3	-42	14.4	4.5	9	9	99.4	105.9	1	1	3	-41	109.8	104.7	10	10	128.7	122.8	
19	3	-43	21.0	21.0	9	9	14.4	14.4	1	1	3	-42	22.3	21.5	10	10	53.1	45.5	
19	3	-44	68.5	73.8	9	9	53.6	52.9	1	1	3	-43	72.3	65.1	10	10	53.1	48.7	
19	3	-45	5.5	3.1	9	9	143.0	141.0	1	1	3	-44	19.3	12.4	10	10	128.8	131.5	
19	3	-46	117.4	113.2	9	9	193.7	176.5	1	1	3	-45	41.1	38.1	10	10	52.8	54.5	
19	3	-47	31.2	26.9	9	9	39.7	36.3	1	1	3	-46	27.5	22.9	10	10	47.2	55.2	
19	3	-48	21.5	20.5	9	9	19.1	6.8	1	1	3	-47	85.2	77.7	10	10	40.3	47.1	
19	3	-49	10.5	17.3	9	9	163.2	186.9	1	1	3	-48	24.9	22.3	10	10	50.9	58.2	
19	3	-50	9.8	9.8	9	9	41.9	6.8	1	1	3	-49	5.5	5.3	10	10	57.1	64.2	
19	3	-51	52.2	48.8	9	9	17.4	11.4	1	1	3	-50	0.5	0.5	10	10	51.5	54.8	
19	3	-52	98.8	98.8	9	9	17.4	11.4	1	1	3	-51	32.2	25.8	10	10	21.9	24.8	

17	3	-9	5.8	2.5	7	3	2	17.4	11.4	18	4	0	32.2	25.8	8	4	4	21.9	24.8
17	3	-10	16.2	2.6	7	3	3	151.7	169.9	18	4	-1	13.6	3.7	8	4	5	26.8	30.3
17	3	-11	5.9	9.9	7	3	4	13.1	14.2	18	4	-2	26.6	28.4	8	4	6	120.9	124.1
17	3	-12	5.9	1.9	7	3	5	70.6	78.7	18	4	-3	27.4	24.4	8	4	7	75.3	77.6
17	3	-13	27.0	25.7	7	3	6	167.4	179.0	18	4	-4	10.8	3.2	8	4	8	28.3	28.3
17	3	-14	47.6	47.3	7	3	7	46.5	52.1	18	4	-5	6.0	4.2	8	4	9	36.0	35.5
17	3	-15	13.6	18.3	7	3	8	20.0	19.7	18	4	-6	70.7	72.0	8	4	10	117.6	111.0
17	3	-16	35.6	36.0	7	3	9	26.7	21.4	18	4	-7	35.2	34.8	8	4	11	36.0	24.5
17	3	-17	23.6	22.7	7	3	10	23.2	23.1	18	4	-8	98.1	100.0	8	4	12	36.2	29.0
15	3	-18	70.3	67.8	7	3	11	47.6	48.9	18	4	-9	118.3	121.2	8	4	13	5.7	10.6
15	3	-17	26.3	25.0	7	3	12	32.6	39.1	18	4	-10	14.7	10.9	6	4	14	26.3	20.8
15	3	-16	19.7	25.0	7	3	13	30.5	29.2	18	4	-11	71.5	74.0	6	4	15	73.8	66.7
15	3	-15	51.6	28.6	7	3	14	27.3	25.6	18	4	-12	51.9	53.8	6	4	16	5.6	9.4
15	3	-14	35.1	33.7	5	3	15	33.3	29.2	18	4	-13	65.0	69.4	6	4	17	64.0	61.4
15	3	-13	22.4	27.5	5	3	16	15.7	11.1	18	4	-14	15.5	19.5	6	4	18	73.7	72.1
15	3	-12	27.4	32.1	5	3	17	10.7	5.9	18	4	-15	56.0	57.1	6	4	19	39.0	41.3
15	3	-11	24.5	20.2	5	3	18	16.7	7.1	18	4	-16	18.3	20.4	6	4	20	48.6	46.1
15	3	-10	57.5	59.3	5	3	19	26.0	33.5	16	4	-17	48.2	44.9	6	4	21	80.9	81.4
15	3	-9	29.6	27.7	5	3	10	47.9	51.5	16	4	-18	106.2	104.1	6	4	22	77.3	81.4
15	3	-8	13.1	3.9	5	3	9	79.2	79.8	16	4	-19	6.4	3.7	6	4	23	13.4	1.4
15	3	-7	28.2	28.9	5	3	8	54.9	58.9	16	4	-20	43.0	42.2	6	4	24	57.7	104.7
15	3	-6	29.2	20.1	5	3	7	13.7	8.9	16	4	-21	24.5	23.5	6	4	25	20.2	20.4
15	3	-5	58.3	54.6	5	3	6	48.4	51.2	16	4	-22	14.5	8.2	6	4	26	20.7	13.1
15	3	-4	75.7	83.2	5	3	5	12.0	9.4	16	4	-23	25.4	23.6	6	4	27	13.4	4.6
15	3	-3	16.3	10.0	5	3	4	17.0	11.2	16	4	-24	33.6	37.2	6	4	28	89.7	102.2
15	3	-2	20.6	23.3	5	3	3	55.7	59.4	16	4	-25	73.0	77.4	6	4	29	23.5	8.3

H	K	L	FC	FC	H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FC	FC
6	4	-2	154.9	156.7	15	5	-12	60.9	58.7	5	5	-6	14.8	11.0	5	5	-6	14.8	11.0
6	4	-3	121.0	110.6	15	5	-11	41.0	40.5	5	5	-7	33.5	33.1	5	5	-7	33.5	33.1
6	4	-4	53.1	48.5	15	5	-10	39.7	38.3	5	5	-8	21.9	21.0	5	5	-8	21.9	21.0
6	4	-5	58.0	57.2	15	5	-9	47.7	47.3	5	5	-9	36.9	37.9	5	5	-9	36.9	37.9
6	4	-6	16.2	5.5	15	5	-8	13.2	5.5	5	5	-10	18.7	20.5	5	5	-10	18.7	20.5
6	4	-7	71.3	72.9	15	5	-7	10.1	5.8	5	5	-11	10.7	6.9	5	5	-11	10.7	6.9
6	4	-8	57.5	60.2	15	5	-6	37.1	34.0	5	5	-12	35.8	38.7	5	5	-12	35.8	38.7
6	4	-9	151.2	155.4	15	5	-5	19.7	19.0	5	5	-13	42.9	45.3	5	5	-13	42.9	45.3
6	4	-10	37.0	35.7	15	5	-4	37.1	37.1	5	5	-14	23.4	26.5	5	5	-14	23.4	26.5
6	4	-11	84.9	68.4	15	5	-3	9.5	3.4	5	5	-15	88.5	89.9	5	5	-15	88.5	89.9
6	4	-12	5.6	4.4	15	5	-2	26.3	25.9	5	5	-16	19.4	17.3	5	5	-16	19.4	17.3
6	4	-13	71.6	74.6	15	5	-1	10.3	8.3	5	5	-17	30.0	31.6	5	5	-17	30.0	31.6
6	4	-14	12.3	4.9	15	5	0	74.9	80.4	5	5	-18	5.8	5.6	5	5	-18	5.8	5.6
6	4	-15	33.7	37.0	15	5	1	36.4	41.0	5	5	-19	90.3	93.1	5	5	-19	90.3	93.1
6	4	-16	12.9	16.0	15	5	2	25.9	26.2	5	5	-20	5.6	4.5	5	5	-20	5.6	4.5
6	4	-17	28.2	30.1	15	5	3	35.2	34.4	5	5	-21	20.7	21.6	5	5	-21	20.7	21.6
6	4	-18	66.5	64.0	15	5	4	17.1	5.6	5	5	-22	19.3	21.1	5	5	-22	19.3	21.1
6	4	-19	56.4	56.2	15	5	5	47.9	49.3	5	5	-23	31.0	33.8	5	5	-23	31.0	33.8
6	4	-20	21.9	22.5	15	5	6	16.6	12.1	5	5	-24	39.6	39.4	5	5	-24	39.6	39.4
6	4	-21	27.3	24.9	15	5	7	22.3	23.5	5	5	-25	33.5	29.9	5	5	-25	33.5	29.9
6	4	-22	127.2	128.5	13	5	8	40.8	40.2	5	5	-26	10.4	6.0	5	5	-26	10.4	6.0
6	4	-23	25.6	24.7	13	5	9	18.8	12.9	5	5	-27	46.1	49.0	5	5	-27	46.1	49.0
6	4	-24	39.5	42.7	13	5	10	32.2	30.3	5	5	-28	5.1	8.2	5	5	-28	5.1	8.2
6	4	-25	118.6	122.2	13	5	11	30.4	30.6	5	5	-29	170.5	175.3	5	5	-29	170.5	175.3
6	4	-26	85.9	88.6	13	5	12	40.3	39.6	5	5	-30	12.5	11.0	5	5	-30	12.5	11.0
6	4	-27	78.1	81.6	13	5	13	14.5	13.7	5	5	-31	8.7	9.1	5	5	-31	8.7	9.1
6	4	-28	195.8	198.7	13	5	14	34.0	36.7	5	5	-32	31.5	33.3	5	5	-32	31.5	33.3
6	4	-29	110.8	103.1	13	5	15	19.8	23.9	5	5	-33	47.0	58.6	5	5	-33	47.0	58.6
6	4	-30	11.7	6.8	13	5	16	8.8	10.5	5	5	-34	51.6	54.8	5	5	-34	51.6	54.8
6	4	-31	195.8	198.7	13	5	17	31.9	33.7	5	5	-35	106.5	117.1	5	5	-35	106.5	117.1
6	4	-32	88.0	82.5	13	5	18	46.4	51.4	5	5	-36	66.9	72.1	5	5	-36	66.9	72.1
6	4	-33	14.2	11.4	13	5	19	38.2	42.3	5	5	-37	41.9	43.5	5	5	-37	41.9	43.5
6	4	-34	32.1	34.7	13	5	20	54.9	50.0	5	5	-38	18.4	16.6	5	5	-38	18.4	16.6
6	4	-35	27.4	22.3	13	5	21	26.5	26.6	5	5	-39	43.4	46.4	5	5	-39	43.4	46.4
6	4	-36	51.1	51.4	13	5	22	50.3	51.3	5	5	-40	56.4	61.0	5	5	-40	56.4	61.0
6	4	-37	238.3	255.5	13	5	23	29.7	28.2	5	5	-41	95.1	99.1	5	5	-41	95.1	99.1
6	4	-38	58.0	109.4	13	5	24	23.8	23.5	5	5	-42	11.2	4.1	5	5	-42	11.2	4.1
6	4	-39	110.4	119.2	13	5	25	46.5	47.5	5	5	-43	50.4	57.0	5	5	-43	50.4	57.0
6	4	-40	53.6	59.3	13	5	26	70.5	69.1	5	5	-44	14.0	14.7	5	5	-44	14.0	14.7
6	4	-41	30.2	31.1	13	5	27	15.3	11.7	5	5	-45	23.7	24.1	5	5	-45	23.7	24.1
6	4	-42	16.7	14.1	13	5	28	87.6	87.6	5	5	-46	103.4	103.4	5	5	-46	103.4	103.4
6	4	-43	71.5	64.8	13	5	29	16.3	8.3	5	5	-47	17.5	12.5	5	5	-47	17.5	12.5
6	4	-44	15.2	17.6	13	5	30	11.7	11.7	5	5	-48	21.1	22.1	5	5	-48	21.1	22.1
6	4	-45	19.9	19.9	13	5	31	16.0	13.2	5	5	-49	5.6	9.5	5	5	-49	5.6	9.5
6	4	-46	54.5	54.5	11	5	32	28.5	26.9	5	5	-50	83.6	84.1	5	5	-50	83.6	84.1
6	4	-47	36.3	33.7	11	5	33	27.9	28.9	5	5	-51	34.1	33.8	5	5	-51	34.1	33.8
6	4	-48	36.8	36.8	11	5	34	29.6	24.9	5	5	-52	91.6	93.0	5	5	-52	91.6	93.0
6	4	-49	25.4	25.0	11	5	35	25.7	25.0	5	5	-53	20.0	17.9	5	5	-53	20.0	17.9
6	4	-50	5.7	2.1	11	5	36	6.0	2.7	5	5	-54	48.7	50.6	5	5	-54	48.7	50.6
6	4	-51	18.8	17.5	11	5	37	21.5	17.4	5	5	-55	43.0	44.7	5	5	-55	43.0	44.7
6	4	-52	47.1	47.7	11	5	38	90.7	86.0	5	5	-56	84.4	87.6	5	5	-56	84.4	87.6
6	4	-53	24.2	20.6	11	5	39	22.4	17.5	5	5	-57	38.4	39.6	5	5	-57	38.4	39.6
6	4	-54	143.2	146.0	11	5	40	47.9	45.8	5	5	-58	24.8	27.5	5	5	-58	24.8	27.5
6	4	-55	64.8	65.0	11	5	41	45.5	45.6	5	5	-59	8.5	8.3	5	5	-59	8.5	8.3
6	4	-56	146.2	150.8	11	5	42	76.0	76.6	5	5	-60	16.5	21.5	5	5	-60	16.5	21.5
6	4	-57	32.3	33.2	11	5	43	118.4	116.4	5	5	-61	17.5	17.5	5	5	-61	17.5	17.5
6	4	-58	58.3	61.5	11	5	44	118.4	116.4	5	5	-62	17.5	17.5	5	5	-62	17.5	17.5

2	2	5	38.9	61.5	116.4	26.1
2	2	5	28.1	36.3	116.4	14.0
2	2	5	3.7	3.7	21.4	55.4
2	2	5	95.9	104.6	111.6	132.5
2	2	5	20.5	17.3	70.9	20.4
2	2	5	45.9	52.6	44.1	70.1
2	2	5	16.9	13.5	1.0	85.6
2	2	5	35.5	32.6	55.3	13.2
2	2	5	68.2	66.7	18.0	85.9
2	2	5	16.5	22.0	30.8	64.5
2	2	5	17.0	6.1	20.5	39.7
2	2	5	193.6	159.1	6.9	8.7
2	2	5	26.0	22.4	5.5	42.6
2	2	5	103.0	109.0	51.8	16.8
2	2	5	79.9	81.2	32.3	32.4
2	2	5	62.2	64.5	2.9	58.3
2	2	5	19.3	18.3	2.0	41.3
2	2	5	28.2	32.3	31.6	17.3
2	2	5	78.2	82.3	11.4	102.8
2	2	5	25.6	22.8	0.2	15.8
2	2	5	11.9	13.0	63.2	50.1
2	2	5	30.5	30.0	26.9	70.2
2	2	5	54.7	54.7	8.8	51.0
2	2	5	11.7	12.7	22.4	60.1
2	2	5	11.7	11.7	38.3	58.9
2	2	5	77.3	73.6	70.7	23.9
2	2	5	65.9	64.6	85.6	91.5
2	2	5	17.6	16.4	72.7	43.0
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2	2	5	96.3	96.7	20.5	32.2
2	2	5	41.4	44.2	11.3	41.7
2	2	5	14.6	15.0	83.5	27.5
2	2	5	49.4	51.6	77.6	16.0
2	2	5	15.4	11.4	18.9	54.4
2	2	5	170.7	178.4	116.7	17.2
2	2	5	52.9	51.3	0.3	21.1
2	2	5	73.7	76.9	84.8	36.2
2	2	5	105.7	108.8	55.9	29.1
2	2	5	43.2	43.7	24.1	27.3
2	2	5	13.2	16.0	61.8	62.7
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2	2	5	5.9	1.4	39.5	37.2
2	2	5	43.7	44.0	40.2	37.5
2	2	5	31.4	30.9	66.0	59.0
2	2	5	32.5	30.5	31.7	63.9
2	2	5	26.6	26.8	1.0	34.3
2	2	5	25.3	24.3	4.8	15.4
2	2	5	25.3	21.4	17.0	37.4
2	2	5	14.5	18.2	8.2	70.0
2	2	5	18.0	18.0	36.3	27.4
2	2	5	16.5	18.0	20.1	34.6
2	2	5	19.2	16.6	45.2	93.9
2	2	5	9.3	9.3	92.2	50.5
2	2	5	43.2	47.6	113.7	6.2
2	2	5	23.0	23.3	5.7	49.5
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2	2	5	12.1	11.4	110.0	57.5
2	2	5	12.9	13.4	94.7	30.8
2	2	5	17.9	17.5	75.8	44.9
2	2	5	37.5	35.7	81.8	46.9
2	2	5	16.0	14.7	30.3	79.9
2	2	5	13.1	12.4	21.2	10.3
2	2	5	6.1	4.5	66.8	34.4
2	2	5	75.2	74.8	77.4	54.8
2	2	5	22.8	23.5	35.8	55.4
2	2	5	33.3	29.4	52.2	57.5
2	2	5	35.0	33.8	81.3	41.6
2	2	5	41.2	38.0	60.0	18.7
2	2	5	24.5	23.4	25.5	14.4
2	2	5			121.7	14.4
2	2	5			115.9	6.6
2	2	5			17.8	17.8
2	2	5			15.8	15.8
2	2	5			50.4	50.4
2	2	5			126.4	132.5
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2	2	5			5.5	8.7
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2	2	5			10.1	16.8
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2	2	5			41.9	41.3
2	2	5			24.3	17.3
2	2	5			99.0	102.8
2	2	5			16.6	15.8
2	2	5			52.2	50.1
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2	2	5			22.9	23.9
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2	2	5			16.0	17.2
2	2	5			54.4	51.2
2	2	5			21.1	21.1
2	2	5			36.2	33.7
2	2	5			33.7	32.9
2	2	5			29.1	27.3
2	2	5			62.7	61.8
2	2	5			100.4	103.9
2	2	5			37.2	37.5
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2	2	5			93.0	93.9
2	2	5			50.5	47.2
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2	2	5			49.5	50.6
2	2	5			38.1	33.7
2	2	5			57.5	53.5
2	2	5			30.8	26.2
2	2	5			44.9	43.2
2	2	5			46.9	47.7
2	2	5			79.9	79.6
2	2	5			10.3	4.8
2	2	5			34.4	31.7
2	2	5			39.5	39.5
2	2	5			54.8	53.0
2	2	5			55.4	57.5
2	2	5			41.6	42.9
2	2	5			18.7	20.9
2	2	5			14.4	11.1
2	2	5			59.9	63.3

19	5	2	24.5	23.4	7	5	6	115.9	121.7	14	6	1	26.8	22.9
17	5	4	10.9	12.4	7	5	8	48.4	45.9	14	6	2	67.7	70.7
17	5	3	5.5	9.5	7	5	9	15.7	13.1	14	6	3	54.9	55.3
17	5	2	15.4	13.4	7	5	10	5.5	3.3	14	6	4	44.0	46.4
17	5	1	47.8	46.4	7	5	11	20.4	20.7	14	6	5	10.0	4.6
17	5	0	56.1	56.3	7	5	12	40.2	38.2	12	6	6	29.5	30.2
17	5	-1	5.6	8.2	5	5	13	5.7	7.8	12	6	7	51.9	49.8
17	5	-2	68.0	85.4	5	5	14	13.2	18.4	12	6	8	12.7	14.9
17	5	-3	8.0	6.2	5	5	15	41.5	44.8	12	6	9	37.9	38.3
17	5	-4	56.4	59.3	5	5	16	41.5	46.0	12	6	10	14.2	13.9
17	5	-5	45.9	47.8	5	5	17	5.4	2.6	12	6	11	108.8	117.9
17	5	-6	68.8	68.1	5	5	18	4.9	4.1	12	6	12	28.4	25.0
17	5	-7	18.9	13.3	5	5	19	38.2	39.8	12	6	13	4.9	5.7
17	5	-8	36.0	37.9	5	5	20	36.1	37.0	12	6	14	54.3	62.6
17	5	-9	13.5	8.1	5	5	21	31.1	32.8	12	6	15	9.4	2.5
17	5	-10	39.4	43.2	5	5	22	24.6	23.7	12	6	16	38.9	41.8
17	5	-11	17.7	14.3	5	5	23	37.0	37.3	12	6	17	24.3	15.0
17	5	-12	24.9	22.9	5	5	24	66.9	74.5	12	6	18	134.0	131.4
17	5	-13	50.9	51.0	5	5	25	54.0	64.1	12	6	19	41.9	42.0
17	5	-14	6.3	4.3	5	5	26	122.6	155.9	12	6	20	49.8	44.5
17	5	-15	25.6	29.9	5	5	27	21.8	20.2	12	6	21	33.2	32.1
15	5	-16	25.0	24.2	5	5	28	67.4	67.3	12	6	22	99.3	96.3
15	5	-17	22.0	17.4	5	5	29	111.4	104.4	12	6	23	93.7	91.0
15	5	-18	6.3	3.1	5	5	30	63.3	64.4	12	6	24	40.5	36.2
15	5	-19	6.3	6.5	5	5	31	11.9	13.9	12	6	25	29.1	28.9

H	K	L	FC	FC	H	K	L	FC	FC	H	K	L	FC	FC	H	K	L	FC	FC
12	6	-13	73.1	72.8	6	6	6	26.8	31.1	0	6	13	68.7	67.3	11	7	2	39.3	41.4
12	6	-14	57.7	54.7	6	6	1	61.3	72.3	0	6	12	48.7	50.7	11	7	3	23.5	22.6
10	6	-15	26.1	26.0	6	6	2	90.2	100.1	0	6	11	30.7	32.1	11	7	4	22.0	23.2
10	6	-14	67.0	65.3	6	6	3	42.5	46.9	0	6	10	117.7	117.1	11	7	6	57.1	59.0
10	6	-13	40.6	39.2	6	6	4	31.2	32.8	0	6	9	36.6	34.6	9	7	8	10.1	4.3
10	6	-12	50.1	50.0	6	6	5	83.7	88.8	0	6	8	15.6	13.6	9	7	7	16.6	10.9
10	6	-11	9.4	14.0	6	6	6	56.7	57.3	0	6	7	14.2	1.9	9	7	6	48.2	49.3
10	6	-10	14.3	5.3	6	6	7	16.6	18.8	0	6	6	110.1	114.0	9	7	5	21.7	25.4
10	6	-9	48.8	44.1	6	6	8	41.4	42.2	0	6	5	62.4	62.7	9	7	4	30.7	31.2
10	6	-8	39.9	35.4	6	6	9	18.5	18.1	0	6	4	101.2	101.4	9	7	3	19.9	19.0
10	6	-7	30.0	24.3	6	6	10	105.2	103.5	0	6	3	196.1	202.4	9	7	2	12.0	16.5
10	6	-6	42.2	39.7	6	6	11	13.5	5.6	0	6	2	7.1	4.1	9	7	1	4.8	6.3
10	6	-5	51.4	48.2	6	6	12	5.6	4.9	0	6	1	11.4	10.2	9	7	0	64.9	69.9
10	6	-4	5.7	1.4	6	6	11	5.6	10.3	0	6	0	11.4	10.2	9	7	0	64.9	69.9
10	6	-3	39.6	37.9	6	6	10	72.4	70.1	0	6	0	76.2	73.2	9	7	0	33.5	35.3
10	6	-2	27.6	30.8	6	6	9	47.9	47.0	0	6	0	25.6	23.1	9	7	0	10.5	2.6
10	6	-1	51.7	57.6	6	6	8	18.5	18.1	0	6	0	6.0	10.6	9	7	0	22.7	22.0
10	6	0	58.9	65.9	6	6	7	102.4	105.8	0	6	0	18.5	16.9	9	7	0	46.0	40.1
10	6	1	66.5	76.1	6	6	6	49.0	50.5	0	6	0	20.6	24.3	9	7	0	31.8	27.0
10	6	2	89.7	100.6	6	6	5	61.4	65.7	0	6	0	35.4	26.4	9	7	0	26.2	20.8
10	6	3	4.8	2.5	6	6	4	15.4	12.3	0	6	0	42.1	44.3	9	7	0	67.0	62.2
10	6	4	24.1	27.9	6	6	3	15.1	1.4	0	6	0	17.9	13.5	9	7	0	13.5	10.1
10	6	5	12.3	2.5	6	6	2	23.1	20.9	0	6	0	6.0	2.7	9	7	0	93.2	86.5
10	6	6	53.0	51.4	6	6	1	21.9	20.5	0	6	0	37.9	35.8	9	7	0	13.1	29.4
10	6	7	57.7	55.2	6	6	0	165.5	208.0	0	6	0	18.2	19.1	9	7	0	58.0	8.1
10	6	8	93.2	91.3	6	6	-1	54.7	55.5	0	6	0	22.4	23.3	9	7	0	12.2	5.6
10	6	9	15.3	17.0	6	6	-2	72.2	65.7	0	6	0	17.6	14.4	9	7	0	21.5	20.7
8	6	10	5.6	4.5	6	6	-3	153.0	143.1	0	6	0	20.4	14.9	9	7	0	26.7	28.7
8	6	9	72.7	66.6	6	6	-4	18.2	15.6	0	6	0	21.9	21.4	9	7	0	13.5	11.4
8	6	8	25.3	27.0	6	6	-5	36.7	37.4	0	6	0	5.7	9.7	9	7	0	51.8	49.8
8	6	7	37.6	42.7	6	6	-6	10.4	10.3	0	6	0	19.2	21.5	9	7	0	98.0	94.4
8	6	6	38.7	37.4	6	6	-7	101.2	102.6	0	6	0	26.5	24.4	9	7	0	24.3	22.4
8	6	5	31.2	32.9	6	6	-8	67.5	65.5	0	6	0	27.1	28.5	9	7	0	34.3	31.2
8	6	4	17.5	11.4	6	6	-9	16.9	15.3	0	6	0	47.9	50.3	9	7	0	63.7	59.0
8	6	3	108.6	122.3	6	6	-10	77.0	78.0	0	6	0	22.1	19.1	9	7	0	22.2	23.6
8	6	2	11.8	19.3	6	6	-11	54.1	53.4	0	6	0	17.4	21.7	9	7	0	101.1	90.3
8	6	1	62.1	73.7	6	6	-12	28.7	26.6	0	6	0	11.2	10.1	9	7	0	30.6	27.3
8	6	0	110.4	128.4	6	6	-13	24.8	21.3	0	6	0	24.9	23.1	9	7	0	15.5	12.1
8	6	-1	49.2	56.5	6	6	-14	38.6	38.8	0	6	0	50.4	52.6	9	7	0	44.0	46.4
8	6	-2	15.2	11.4	6	6	-15	29.8	30.4	0	6	0	24.3	26.6	9	7	0	31.3	34.4
8	6	-3	55.0	51.1	6	6	-14	19.1	11.8	0	6	0	24.9	26.1	9	7	0	14.7	14.6
8	6	-4	150.9	136.9	6	6	-13	57.6	56.2	0	6	0	43.0	47.4	9	7	0	10.2	8.7
8	6	-5	14.9	5.2	6	6	-12	5.6	5.9	0	6	0	29.6	29.1	9	7	0	88.1	87.7
8	6	-6	15.7	1.6	6	6	-11	75.9	77.9	0	6	0	24.6	24.0	9	7	0	23.4	23.3
8	6	-7	135.7	127.5	6	6	-10	43.3	44.1	0	6	0	63.1	59.9	9	7	0	45.4	46.8
8	6	-8	36.0	35.7	6	6	-9	86.8	89.5	0	6	0	50.8	49.2	9	7	0	83.6	85.5
8	6	-9	36.4	32.9	6	6	-8	41.0	42.4	0	6	0	5.5	2.3	9	7	0	27.2	23.4
8	6	-10	44.0	46.4	6	6	-7	18.2	11.5	0	6	0	5.6	3.9	9	7	0	10.6	10.9
8	6	-11	14.4	10.2	6	6	-6	56.1	55.3	0	6	0	6.0	6.7	9	7	0	15.2	10.9
8	6	-12	14.4	10.2	6	6	-5	18.2	19.1	0	6	0	37.8	34.5	9	7	0	51.5	49.4
8	6	-13	119.0	121.7	6	6	-4	20.5	18.0	0	6	0	35.9	32.5	9	7	0	22.1	22.1
8	6	-14	28.6	29.0	6	6	-3	51.4	52.1	0	6	0	42.0	37.8	9	7	0	31.4	32.7
8	6	-15	31.6	27.4	6	6	-1	36.1	38.1	0	6	0	41.7	39.5	9	7	0	14.3	4.3
6	6	-14	28.4	29.6	6	6	0	68.2	86.4	0	6	0	63.8	59.7	9	7	0	34.1	36.7
6	6	-13	5.8	10.5	6	6	1	47.1	50.2	0	6	0	45.9	45.9	9	7	0	19.9	14.6
6	6	-12	5.7	4.6	6	6	2	72.2	77.2	0	6	0	13.1	8.6	9	7	0	24.5	24.4
6	6	-11	52.8	53.5	6	6	3	16.7	11.2	0	6	0	13.1	8.6	9	7	0	41.9	42.6
6	6	-10	14.7	8.0	6	6	4	16.1	10.5	0	6	0	85.6	76.4	9	7	0	41.9	42.6
6	6	-10	63.4	60.5	6	6	5	99.6	103.7	0	6	0	22.6	2.8	9	7	0	39.7	40.6



H	K	L	FC	FC	H	K	L	FC	FC	H	K	L	FC	FC	H	K	L	FC	FC
5	7	-8	5.1	3.3	12	8	8	99.6	101.4	4	8	4	48.0	49.0	3	9	5	11.0	0.5
5	7	-9	21.5	21.1	12	8	1	37.1	36.1	4	8	5	67.5	66.3	3	9	4	13.5	5.7
5	7	-10	70.3	68.6	12	8	2	55.2	52.8	4	8	6	38.9	36.2	3	9	3	21.4	18.5
5	7	-11	29.6	31.9	10	8	4	22.3	16.4	4	8	7	17.6	14.7	3	9	3	47.2	47.2
5	7	-12	18.5	14.7	10	8	3	33.3	32.3	4	8	8	14.2	1.3	3	9	3	21.4	18.5
5	7	-13	28.2	28.0	10	8	2	90.8	97.0	2	8	9	30.3	25.7	3	9	3	47.2	47.2
3	7	-13	5.6	5.7	10	8	1	22.4	21.8	2	8	8	93.3	86.8	3	9	3	47.2	47.2
3	7	-12	5.5	6.9	10	8	0	5.0	3.9	2	8	7	29.2	28.7	3	9	3	47.2	47.2
3	7	-11	25.7	25.8	10	8	-1	67.0	67.5	2	8	6	38.8	37.8	3	9	3	47.2	47.2
3	7	-10	40.8	36.8	10	8	-2	29.4	28.4	2	8	5	30.9	27.7	3	9	3	47.2	47.2
3	7	-9	23.2	21.0	10	8	-3	26.8	27.2	2	8	4	20.2	13.5	3	9	3	47.2	47.2
3	7	-8	8.2	4.9	10	8	-4	40.4	34.5	2	8	3	69.0	69.9	3	9	3	47.2	47.2
3	7	-7	53.0	30.3	10	8	-5	68.3	63.6	2	8	2	22.0	20.4	3	9	3	47.2	47.2
3	7	-6	15.0	5.1	10	8	-6	57.2	50.0	2	8	-3	4.9	4.7	3	9	3	47.2	47.2
3	7	-5	49.6	46.4	10	8	-7	38.4	33.2	2	8	-4	17.8	20.8	3	9	3	47.2	47.2
3	7	-4	62.6	63.3	10	8	-8	52.6	45.9	2	8	-5	89.4	85.8	3	9	3	47.2	47.2
3	7	-3	18.2	20.1	10	8	-9	10.1	3.7	2	8	-6	48.2	46.6	3	9	3	47.2	47.2
3	7	-2	13.4	15.0	10	8	-10	49.6	40.8	2	8	-7	71.2	66.6	3	9	3	47.2	47.2
3	7	-1	35.6	36.2	10	8	-10	122.6	111.2	2	8	-8	42.1	38.0	3	9	3	47.2	47.2
3	7	0	17.3	16.4	8	8	-5	12.6	10.7	2	8	-9	35.6	35.3	3	9	3	47.2	47.2
3	7	1	30.4	33.6	8	8	-6	81.1	74.1	2	8	-10	43.1	40.0	3	9	3	47.2	47.2
3	7	2	23.1	20.1	8	8	-7	5.9	7.0	2	8	9	21.1	17.1	3	9	3	47.2	47.2
3	7	3	35.5	38.0	8	8	-8	45.8	33.9	2	8	8	23.4	16.8	3	9	3	47.2	47.2
3	7	4	22.8	18.9	8	8	-9	76.0	63.4	2	8	7	88.3	89.4	3	9	3	47.2	47.2
3	7	5	13.5	9.9	8	8	-10	34.4	32.4	2	8	6	53.0	49.1	3	9	3	47.2	47.2
3	7	6	33.9	35.5	8	8	-3	74.8	69.1	2	8	5	35.9	36.6	3	9	3	47.2	47.2
3	7	7	22.8	25.4	8	8	-2	34.4	32.4	2	8	4	57.2	57.1	3	9	3	47.2	47.2
3	7	8	48.3	48.3	8	8	-1	30.7	31.4	2	8	3	17.6	20.8	3	9	3	47.2	47.2
3	7	9	98.3	96.5	8	8	0	26.0	27.9	2	8	2	6.8	6.2	3	9	3	47.2	47.2
3	7	10	13.5	15.0	8	8	1	26.0	27.9	2	8	-1	34.7	31.2	3	9	3	47.2	47.2
3	7	11	54.7	51.4	8	8	2	7.8	3.3	2	8	-2	41.1	37.0	3	9	3	47.2	47.2
3	7	12	13.0	16.2	8	8	3	24.5	20.8	2	8	-3	9.9	2.2	3	9	3	47.2	47.2
3	7	11	31.9	31.0	8	8	4	5.0	3.6	2	8	-2	7.6	72.9	3	9	3	47.2	47.2
3	7	10	21.4	19.0	8	8	5	5.2	7.4	2	8	-1	65.5	72.9	3	9	3	47.2	47.2
3	7	9	5.1	5.4	8	8	6	74.9	66.3	2	8	0	32.6	38.3	3	9	3	47.2	47.2
3	7	8	26.0	25.9	8	8	7	66.2	58.2	2	8	1	22.3	28.2	3	9	3	47.2	47.2
3	7	7	36.7	34.5	8	8	8	73.0	67.5	2	8	2	17.2	14.8	3	9	3	47.2	47.2
3	7	6	20.1	17.1	8	8	9	9.3	8.8	2	8	3	37.2	35.3	3	9	3	47.2	47.2
3	7	5	28.9	27.2	8	8	4	75.1	74.3	2	8	4	26.4	27.9	3	9	3	47.2	47.2
3	7	4	29.4	27.3	8	8	3	7.4	4.4	2	8	5	63.3	72.4	3	9	3	47.2	47.2
3	7	3	45.3	45.3	8	8	2	31.1	31.2	2	8	6	16.3	14.6	3	9	3	47.2	47.2
3	7	2	15.7	9.5	8	8	1	12.6	4.3	2	8	-1	10.0	5.7	3	9	3	47.2	47.2
3	7	1	4.7	2.1	8	8	0	59.4	62.9	2	8	-2	10.0	45.3	3	9	3	47.2	47.2
3	7	-1	17.0	16.2	8	8	-1	24.5	18.5	2	8	-3	53.1	45.3	3	9	3	47.2	47.2
3	7	-2	81.1	85.4	8	8	-2	61.7	59.6	2	8	-4	48.4	43.2	3	9	3	47.2	47.2
3	7	-3	40.6	38.6	8	8	-3	73.4	62.0	2	8	-5	10.0	9.9	3	9	3	47.2	47.2
3	7	-4	72.1	71.2	8	8	-4	37.3	33.2	2	8	-6	64.2	55.9	3	9	3	47.2	47.2
3	7	-5	52.9	51.1	8	8	-5	27.8	25.0	2	8	-7	10.3	14.6	3	9	3	47.2	47.2
3	7	-6	35.6	32.0	8	8	-6	5.6	3.6	2	8	-8	20.8	17.8	3	9	3	47.2	47.2
3	7	-7	45.2	42.6	8	8	-7	34.6	30.9	2	8	-9	67.0	68.5	3	9	3	47.2	47.2
3	7	-8	28.4	24.1	8	8	-8	31.9	28.6	2	8	-10	43.0	1.8	3	9	3	47.2	47.2
3	7	-9	23.5	21.6	8	8	-9	90.8	84.7	2	8	-11	5.2	3.6	3	9	3	47.2	47.2
3	7	-10	5.5	5.9	8	8	-10	42.6	41.0	2	8	-12	14.8	15.5	3	9	3	47.2	47.2
3	7	-11	23.5	21.6	8	8	-11	78.8	71.3	2	8	-13	9.3	7.3	3	9	3	47.2	47.2
3	7	-12	69.3	70.6	8	8	-12	47.8	41.0	2	8	-14	13.5	15.5	3	9	3	47.2	47.2
3	7	-13	25.2	25.0	8	8	-13	37.8	36.4	2	8	-15	5.7	5.7	3	9	3	47.2	47.2
3	7	-14	45.4	43.9	8	8	-14	40.6	37.3	2	8	-16	21.4	18.5	3	9	3	47.2	47.2
3	7	-15	65.0	61.4	8	8	-15	62.3	57.3	2	8	-17	38.2	37.1	3	9	3	47.2	47.2
3	7	-16	89.8	80.4	8	8	-16	16.1	14.6	2	8	-18	11.0	0.5	3	9	3	47.2	47.2



12	E	-5	89.8	80.4	4	8	-5	16.1	14.6	1	9	5	11.0	0.5
12	E	-8	55.8	49.1	4	8	-4	105.9	96.7	1	9	4	48.5	44.3
12	E	-7	65.5	61.2	4	8	-3	76.3	61.9	1	9	3	14.5	14.1
12	E	-6	43.3	35.9	4	8	-2	35.1	30.4	1	9	2	5.5	3.9
12	E	-5	5.8	5.1	4	8	-1	14.8	12.1	1	9	-2	24.3	33.0
12	E	-4	17.8	18.2	4	8	0	15.4	13.9	1	9	-3	5.1	5.7
12	E	-3	43.3	41.9	4	8	1	15.1	13.1	1	9	-4	70.3	69.5
12	E	-2	61.3	63.9	4	8	2	36.3	33.7	1	9	-5	15.3	11.2
12	E	-1	28.5	30.4	4	8	3	123.1	124.5	1	9	-6	22.5	16.7