

Mathematics homework #1

Homework consists of 14 exercises. Exercises are numbered and title with their topics are marked near the number to make solution process easier.

Exercise statements use parameters a, b, c , etc. to make tasks distinct for different students. List of parameter values is present in table 1 in appendix A.

Solutions should be handwritten in the exercise notebook with rather thorough explanations regarding notation introduced by the student (i.e. what are the events A, B etc.) and chosen ways to solve the problems. Each solution should start with the exercise statement with the individual parameter values. Notebooks should be labeled with student name with the number according to table 1 of the appendix A, group number and homework number.

- If the student is currently in Novgorod, these notebooks should be handed over to the lecturer (or to a methodist).
- If the student is abroad, the pictures of every solution should be taken and sent to lecturer's email, with subject including student's name with the number according to table 1 of the appendix A, group number and homework number.

Some of the exercises are only to be completed if the student does not finish the homework until 19th of December 2020 (further referred as the deadline), they are marked as such. So, if the students submits his or her work before the deadline, only first 10 exercises have to be done.

Exercise 1: classical probability

A box contains marbles. There are a red marbles, b blue marbles, c green marbles, d yellow marbles and e white marbles. What is the probability that the randomly chosen marble is f ?

Exercise 2: complement of the event

A box contains marbles. There are a red marbles, b blue marbles, c green marbles, d yellow marbles and e white marbles. What is the probability that the randomly chosen marble is not g ?

Exercise 3: compound events

A box contains marbles. There are a red marbles, b blue marbles, c green marbles, d yellow marbles and e white marbles. Two marbles are consequently taken out of box at random. What is the probability that the first marble is g and the second is f ?

Exercise 4: compound events

What is the probability that the card taken out of deck is h or i ?

Exercise 5: counting rules

A person has a scarfs, b hats and d jackets. How many ways to choose a scarf, a hat and a jacket does this person have?

Exercise 6: counting rules

Password can contain j English letters and numbers. Length of password is e symbols. How many passwords are possible?

Exercise 7: counting rules

A student has c different notebooks and decided to give a of them to a friend. How many ways does he have to give away these notebooks?

Exercise 8: counting rules

A student has d different notebooks and a different subjects. How many ways does he have to assign a notebook to a subject?

Exercise 9: total probability law

There were b apples and c oranges in the first basket. There are d apples and e oranges in the second basket. One basket is chosen. Probability to choose the first basket is $1/a$. One fruit is taken out. What is the probability that this fruit is an apple?

Exercise 10: Bayes' theorem

There were b apples and c oranges in the first basket. There are d apples and e oranges in the second basket. One basket is chosen. Probability to choose the first basket is $1/a$. One fruit is taken out, and it is an orange. What is the probability that the first basket was chosen?

Exercise 11: to be done if solutions are submitted after the deadline

What is the probability that out of b cards that are taken out of the deck all are h ?

Exercise 12: to be done if solutions are submitted after the deadline

What is the probability that out of b cards that are taken out of the deck at least one is h ?

Exercise 13: to be done if solutions are submitted after the deadline

What is the probability that out of c cards that are taken out of the deck exactly 4 is h ?

Exercise 14: to be done if solutions are submitted after the deadline

There were b apples and c oranges in the first basket. There are d apples and e oranges in the second basket. One basket is chosen. Probability to choose the first basket is $1/a$. One fruit is taken out, and it is an orange. What is the probability that the second basket was chosen?

Appendix A: individual parameter values

Table 1 — Parameter values for exercises

#	Student name	a	b	c	d	e	f	g	h	i	j
1	Абделвахаб Мохамед Ибрахим Елсайед Мохамед Шамселдин	2	4	15	12	12	red	green	red	a number	lowercase
2	Абдельвахаб Ахмед Осама Мосбах	3	5	14	11	10	green	blue	black	a face card	uppercase
3	Абдельхамид Рихам Соубхи Махмоуд	4	8	13	10	8	blue	white	spades	an ace	lower and uppercase
4	Абдэлсалам Юмна Реда Ахмед	5	10	12	9	12	white	yellow	clubs	an even number	lowercase
5	Али Сайед Мухаммад Хаснаин	6	12	10	12	10	yellow	red	hearts	a face card or 10	uppercase
6	Али Яхья Махмуд Абделрахман	2	4	11	11	8	red	green	diamonds	a number	lower and uppercase
7	Ахмед Гада Ахмед Исмаил	3	5	9	10	12	green	blue	red	a face card	lowercase

#	Student name	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>
8	Ахмед Мохамед Айман Мохамед	4	8	15	9	10	blue	white	black	an ace	uppercase
9	Гергис Абануб Магди Лабиб Заки	5	10	14	12	8	white	yellow	spades	an even number	lower and uppercase
10	Гуерада Мибрук	6	12	13	11	12	yellow	red	clubs	a face card or 10	lowercase
11	Дераз Абдалла Ахмед Мохамед	2	11	12	10	10	red	green	hearts	a number	uppercase
12	Милуд-Бида Абделхади	3	4	10	9	8	green	blue	diamonds	a face card	lower and uppercase
13	Мохамед Ехаб Осама Мохамед Абделрахман	4	5	11	12	12	blue	white	red	an ace	lowercase
14	Мохамед Мохамед Элсайд Абделразек	5	8	9	11	10	white	yellow	black	an even number	uppercase
15	Мохамед Самар Исмаил Моавад	6	10	15	10	8	yellow	red	spades	a face card or 10	lower and uppercase
16	Мустафа Мустафа Салахелдин Абдельфата	2	12	14	9	12	red	green	clubs	a number	lowercase
17	Наджиб Мохамед Сабер Фавзи	3	11	13	12	10	green	blue	hearts	a face card	uppercase
18	Омран Карим Ашраф Мохамед Элсайд	4	4	12	11	8	blue	white	diamonds	an ace	lower and uppercase
19	Осман Алаа Осман Мостафа	5	5	10	10	12	white	yellow	red	an even number	lowercase
20	Тадаха Лончи Седрик	6	8	11	9	10	yellow	red	black	a face card or 10	uppercase
21	Халил Хади Хешам Ряд Мохаммадин	2	10	9	12	8	red	green	spades	a number	lower and uppercase
22	Хассан Омар Фатхи Абдельазим Эльбарбари Мохамед	3	12	15	11	12	green	blue	clubs	a face card	lowercase
23	Ходход Салах Джехад Эльморсси Аббас	4	11	14	10	10	blue	white	hearts	an ace	uppercase
24	Элвакейл Махмуд Айман Абдэлфаттах Али	5	4	13	9	8	white	yellow	diamonds	an even number	lower and uppercase
25	Элкади Мохамед Нассер Элсайд	6	5	12	12	12	yellow	red	red	a face card or 10	lowercase
26	Эльгебали Лоай Эссам Салех	2	8	10	11	10	red	green	black	a number	uppercase
27	Эльхатиб Али Халед Мохамед	3	10	11	10	8	green	blue	spades	a face card	lower and uppercase
28	Эртан Мехель Магди Салах	4	12	9	9	12	blue	white	clubs	an ace	lowercase
29	Абдалла Мохамед Махмуд Атта	5	11	15	12	10	white	yellow	hearts	an even number	uppercase
30	Абдаллах Мариам Ибрахим Мохамед Еззельдин	6	4	14	11	8	yellow	red	diamonds	a face card or 10	lower and uppercase
31	Абделазим Мохамед Хешам Абделфаттах	2	5	13	10	12	red	green	red	a number	lowercase
32	Абделгавад Ахмед Мохамед Али Мохамед Ахмед	3	8	12	9	10	green	blue	black	a face card	uppercase
33	Абдулвахаб Ахмед Тарек Мохамед	4	10	10	12	8	blue	white	spades	an ace	lower and uppercase
34	Абоюссеф Нада Ашраф Самир	5	12	11	11	12	white	yellow	clubs	an even number	lowercase
35	Бехри Доха	6	11	9	10	10	yellow	red	hearts	a face card or 10	uppercase
36	Бйедо Мохамед Али	2	4	15	9	8	red	green	diamonds	a number	lower and uppercase
37	Гевили Манар Имад Омар Омар	3	5	14	12	12	green	blue	red	a face card	lowercase

#	Student name	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>
38	Елбасюни Мохамед Рамадан Махмуд	4	8	13	11	10	blue	white	black	an ace	uppercase
39	Махмуд Мохамед Мохамед Седдек	5	10	12	10	8	white	yellow	spades	an even number	lower and uppercase
40	Рехаб Марам Мохамед Мохамед Али Мохамед	6	12	10	9	12	yellow	red	clubs	a face card or 10	lowercase
41	Сафаа Мохаммед Али Насеер Сафаа	2	11	11	12	10	red	green	hearts	a number	uppercase
42	Ал-Бахрани Кумаил Абдулраззак Хуссейн	3	4	9	11	8	green	blue	diamonds	a face card	lower and uppercase
43	Багху Сухаиль	4	5	15	10	12	blue	white	red	an ace	lowercase
44		5	8	14	9	10	white	yellow	black	an even number	uppercase
45	Камель Ибрам Магди Фарес	6	10	13	12	8	yellow	red	spades	a face card or 10	lower and uppercase
46	Керитам Айя Мохамед Абделькарим Амин	2	12	12	11	12	red	green	clubs	a number	lowercase
47	Рейяд Юссеф Ахмед Мохамед	3	11	10	10	10	green	blue	hearts	a face card	uppercase
48	Саид Мохамед Мохеб Абделхамид	4	4	11	9	8	blue	white	diamonds	an ace	lower and uppercase
49	Туни Мостафа Маджи Хассан	5	5	9	12	12	white	yellow	red	an even number	lowercase
50	Утаифа Иман Абдулла Али Ахмед	6	8	15	11	10	yellow	red	black	a face card or 10	uppercase
51	Шихам Мохаммед Раад	2	10	14	10	8	red	green	spades	a number	lower and uppercase
52	Элджамал Мохамед Хамди Элсаид	3	12	13	9	12	green	blue	clubs	a face card	lowercase
53	Юссеф Мохамед Бадр Хамдин	4	11	12	12	10	blue	white	hearts	an ace	uppercase
54	Абделкадер Магди Айман Мохамед Елмагази	5	4	10	11	8	white	yellow	diamonds	an even number	lower and uppercase
55	Абделмаксуд Шади Хани Мохамед Раби	6	5	11	10	12	yellow	red	red	a face card or 10	lowercase
56	Алхимид Юсиф Ахмед	2	8	9	9	10	red	green	black	a number	uppercase
57	Аль-Хаммади Малак Муниф Мохаммед Абдулла	3	10	15	12	8	green	blue	spades	a face card	lower and uppercase
58	Ахмед Мохамед Ганем Ахмед	4	12	14	11	12	blue	white	clubs	an ace	lowercase
59	Бати Хелуд Ибрагим Шаабан Абделтаваб	5	11	13	10	10	white	yellow	hearts	an even number	uppercase
60	Ефис Мохамед Ахмед Мохамед Ахмед	6	4	12	9	8	yellow	red	diamonds	a face card or 10	lower and uppercase
61	Ибрахим Иоссеф Мохамед Ахмед Мохамед	2	5	10	12	12	red	green	red	a number	lowercase
62	Ибрахим Менаталла Файел Салама	3	8	11	11	10	green	blue	black	a face card	uppercase
63	Месабиx Куидер	4	10	9	10	8	blue	white	spades	an ace	lower and uppercase
64	Мохамед Амр Емад Фаузи	5	12	15	9	12	white	yellow	clubs	an even number	lowercase
65	Рабеа Омар Мохамед Ахмед	6	11	14	12	10	yellow	red	hearts	a face card or 10	uppercase
66	Сабер Ахмед Махмуд Шаабан	2	4	13	11	8	red	green	diamonds	a number	lower and uppercase
67	Сифин Киросос Абделнур Шахид	3	5	12	10	12	green	blue	red	a face card	lowercase
68	Солиман Абдалла Шакер Абделхалек Абделхалек	4	8	10	9	10	blue	white	black	an ace	uppercase
69		5	10	11	12	8	white	yellow	spades	an even number	lower and uppercase

#	Student name	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>
70	Youssef Youssef Tarek Youssef Mohamed	6	12	9	11	12	yellow	red	clubs	a face card or 10	lowercase
71		2	11	15	10	10	red	green	hearts	a number	uppercase
72	Omar Essam Abbas Gadelhak	3	4	14	9	8	green	blue	diamonds	a face card	lower and uppercase
73		4	5	13	12	12	blue	white	red	an ace	lowercase
74	Nedal Sobhi Ibrahim Abdelaal	5	8	12	11	10	white	yellow	black	an even number	uppercase
75		6	10	10	10	8	yellow	red	spades	a face card or 10	lower and uppercase
76		2	12	11	9	12	red	green	clubs	a number	lowercase
77		3	11	9	12	10	green	blue	hearts	a face card	uppercase
78	Emad Ali Ahmed Al-Shaebi	4	4	15	11	8	blue	white	diamonds	an ace	lower and uppercase
79	Mohamed Abdelbakey Elfawy Ebrahim Atic	5	5	14	10	12	white	yellow	red	an even number	lowercase
80		6	8	13	9	10	yellow	red	black	a face card or 10	uppercase
81	Zyad Mohamed Ibrahim Mohamed Eldeeb	2	10	12	12	8	red	green	spades	a number	lower and uppercase
82	Abdulkarem Abdulwahid Krestin	3	12	10	11	12	green	blue	clubs	a face card	lowercase
83	Fedaa Ramadan Anwar Mohamed	4	11	11	10	10	blue	white	hearts	an ace	uppercase
84	Mostafa Osman Selim	5	4	9	9	8	white	yellow	diamonds	an even number	lower and uppercase
85	Архин Фредерик	6	5	15	12	12	yellow	red	red	a face card or 10	lowercase
86	Аямба Малентиба Марк	2	8	14	11	10	red	green	black	a number	uppercase
87	Ибрагим Карим Ибрагим Мохамед	3	10	13	10	8	green	blue	spades	a face card	lower and uppercase
88		4	12	12	9	12	blue	white	clubs	an ace	lowercase
89		5	11	10	12	10	white	yellow	hearts	an even number	uppercase
90		6	4	11	11	8	yellow	red	diamonds	a face card or 10	lower and uppercase
91		2	5	9	10	12	red	green	red	a number	lowercase
92		3	8	15	9	10	green	blue	black	a face card	uppercase
93		4	10	14	12	8	blue	white	spades	an ace	lower and uppercase
94		5	12	13	11	12	white	yellow	clubs	an even number	lowercase
95		6	11	12	10	10	yellow	red	hearts	a face card or 10	uppercase
96		2	4	10	9	8	red	green	diamonds	a number	lower and uppercase
97		3	5	11	12	12	green	blue	red	a face card	lowercase
98		4	8	9	11	10	blue	white	black	an ace	uppercase
99		5	10	15	10	8	white	yellow	spades	an even number	lower and uppercase
100		6	12	14	9	12	yellow	red	clubs	a face card or 10	lowercase