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Annotatsiya: *Usbu maqolada to'plamlar o'rtasida va to'plam ichida aniqlangan binar munosabatlarning xossalari hamda berilish usullari misollar yordamida ochib berilgan.*

Kalit so'zlar: *Tartiblangan juftlik, to'plamlarning dekart ko'paytmasi, to'plamlarning dekart darajasi, binar munosabat, refleksivlik, simmetriklik, tranzitivlik, ekvivalentlik munosabatlari, binar munosabatlarning tartiblangan juftliklar to'plami, graflar, matritsa usullari.*

BINARY RELATIONSHIPS DEFINED WITHIN A COLLECTION ABOUT THE METHODS OF DELIVERY

Abstract:*In this article, the properties of binary relations defined between sets and within a set and their methods are revealed with the help of examples.*

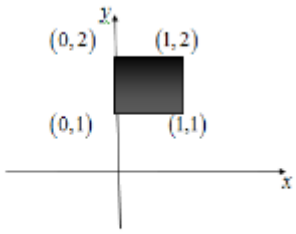
Keywords:*Ordered pair, Cartesian product of sets, Cartesian degree of sets, binary relation, reflexivity, symmetry, transitivity, equivalence relation, set of ordered pairs of binary relations, graphs, matrix methods.*

Binar munosabatlar hisobi 1860-yilda De Morgan tomonidan kiritilgan va keyinchalik Prays va Shridder tomonidan mukammal ishlab chiqilgan. Yarim asr o'tgach Tarski,Jonsson,Lindon va Monk lar zamonaviy model nuqtai nazardan hisobni yanada rivojlantirgan.

Ikkita bo'sh bo'lmagan A va B to'plamlar berilgan bo'lsin. A to'plamga tegishli bo'lgan biror a elementni va B to'plamga tegishli bo'lgan biror b elementni olamiz. Birinchi elementi a, ikkinchi elementi b, bo'lgan tartiblangan (a,b) juftlikni hosil qilamiz. Barcha (a,b) ko'rinishdagi juftliklardan tashkil topgan $\{(a,b)|a \in A, b \in B\}$ to'plam A va B to'plamlarning dekart (to'g'ri) ko'paytmasi deyiladi va $A \times B$ kabi belgilanadi.

Misol 1. $A = B = R$ bo'lsa, $R^2 = R \times R$ dekart ko'paytma tekislikdagi barcha nuqtalar to'plamidan iboratdir.

Misol 2. $A = [0,1]$ va $B = [1,2]$ segment nuqtalaridan iborat to'plamlarni olaylik. Bu to'plamlarning dekart ko'paytmasi $A \times B = \{(x,y)|0 \le x \le 1, 1 \le y \le 2\}$ to'plam 1-chizmada tasvirlangan kvadrat nuqtalaridan iborat to'plam bo'ladi:



1-chizma.

Shuni ta’kidlash lozimki, ikkita (a,b) va (c,d) juftliklar, $a=c$ va $b=d$ bo‘lgandagina teng deb qaraladi. Xuddi shunday bir nechta to‘plamlarning dekart ko‘paytmasini $A_1 \times A_2 \times A_3 \times \ldots \times A_n$ kabi qarashimiz mumkin. Agar $A_1 = A_2 = A_3 = \cdots = A_n$bo‘lsa, u holda ularning dekart ko‘paytmasini qisqacha $A^n = A \times A \times A \times \ldots \times A$ shaklda yozish mumkin va uni n-darajali dekart ko‘paytma deb yuritiladi. A^nning elementlari uzunligi $n$ga teng bo‘lgan $(x_1, x_2, \ldots, x_n), x_i \in A$satrli elementdan iborat bo’ladi.

1-Ta’rif. Ixtiyoriy bo’sh bo’lmagan $A \times B$to’plamning ixtiyoriy$R$qism to’plami $(R \subset A \times B)A$ va B to‘plamlar orasidagi *binar munosabat* deyiladi. Xususan, $A = B$ bo‘lsa, $R \subset A \times B$ binar munosabat A da aniqlangan binar munosabat deyiladi. Binar munosabatlar, odatda R, P, Q kabi harflar bilan belgilanadi. Agar $R \subset A \times A$ binar munosabat aniqlangan bo‘lib, $(\mathrm{x}, \mathrm{y}) \in \mathrm{R}$ bo‘lsa, u holda x element y element bilan R munosabatda deyiladi va xRy kabi belgilanadi.

Misol 3. Haqiqiy sonlar to’plami R da $x = y$ tenglik munosabati binar munosabat bo’ladi.

Misol 4. $A = \{2,5,4,6\}$bo’lsin, $R = \{(x,y) \backslash x < y\}$ to’plam binar munosabat bo’ladi. Ravshanki, bu holda:

$$R = \{(2,4), (2,5), (2,6), (4,5), (4,6), (5,6)\}.$$

Chekli to’plamlarda binar munosabatlar soni ham chekli bo’lib, u $2^n - 1$ formula orqali topiladi. Bu yerda n A to’plamdagi barcha tartiblangan juftliklar soni ya’ni $A^2 = A \times A$ to’plamning elementlari sonidir.

Bizga ma’lumki elementlari soni n ta bo’lgan to’plamning barcha qism to’plamlari 2^n formula orqali aniqlandi (bo’sh to’plam bilan birgalikda).

Masalan, 4-misolda 2^4 ta ya’ni 16 ta tartiblangan juftliklar bor. Binar munosabatlar esa $2^{16} - 1$ ta.

2-Ta’rif.$A$to’plamda aniqlangan Rbinar munosabati uchun quyidagi shartlar bajarilsa, A to’plamning ekvivalentlik munosabati aniqlangan deyiladi:

1. $\forall \mathrm{x} \in \mathrm{A}$ uchun xRx munosabat o’rinli (refleksivlik);

2. xRy munosabatdan yRx munosabatning o’rinliligi kelib chiqsa (simmetrik);

3. xRy munosabatdan yRz munosabatdan xRz munosabat o’rinli ekanligi kelib chiqsa (tranzitivlik).

$A$to’plamning x va y elementlari orasida R ekvivalentlik munosabati qisqachasi x~y shaklda yoziladi.

R to’plam elementlari orasidagi R munosabat Dekart ko’paytmaning har qanday qism to’plami, ya’ni elementlari tartiblangan juftliklar to’plami bo’lganligi uchun munosabatlarning berilish usullari to’plamning berilish usullari bilan bir xil bo’ladi.

A to’plamdan olingan va shu munosabat bilan bog’langan barcha element juftliklarini sanab ko’rsatish bilan berish mumkin. Masalan, $A = \{4,5,6,8\}$ to’plamdagi biror munosabatni quyidagi juftliklar to’plami orqali berish mumkin: $\{(5,4), (6,5)\}$.

Shu munosabatning o’zini matritsa usuli bilan berish mumkin. Buning uchun biz matritsaning satr va ustunlariga to’plam elementlarini joylashtiramiz. So’ngra $A = \{< 5,4 >, < 6,5 >\}$ binar munosabatni matritsasini tuzamiz.

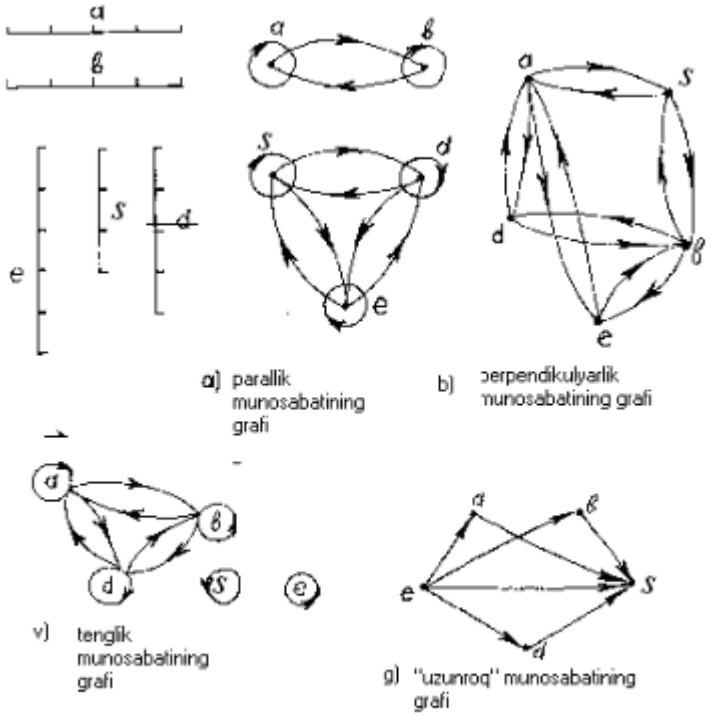
Juftliklardagi 1-elementni satrdan 2-elementni ustundan olib, ular kesishgan joyga *1* qo’yamiz qolgan joylarga esa *0* . Shunda biz qidirgan matritsa paydo bo’ladi (2-chizma).

$$\begin{pmatrix} 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{pmatrix}$$

2-chizma.

Munosabatlarni graflar yordamida ko’rgazmali tasvirlash mumkin. Masalan, $A = \{3,6,9,18\}$ to’plam elementlari uchun karrali munosabatini ko’ramiz va uning grafini chizamiz (3-chizma). 18 soni 3 ga karrali, 18 soni 6 ga karrali, 18 soni 9 ga karrali va hakazo. A to’plamdagi ixtiyoriy son o’z-o’ziga karrali bo’lgani uchun oxiri ustma-ust tushadigan strelkalar mavjud. Bunday strelkalar sirtmoqlar deyiladi.

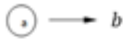
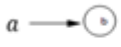
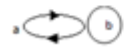
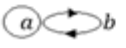
Munosabatlarni xossalarini ajratib ko’rsatish uchun matematikada yuqorida aytib o’tilgan munosabatlarni kesmalar to’plamida graflar yordamida tasvirlaymiz. a, b, s, d, e kesmalar berilgan bo’lsin (4- a, b, v, g chizmalar).



4-chizma.

Misol 5. Endi $A = \{a, b\}$ to'plamni olib undagi barcha munosabatlarni 3 xil ko'rinishda ifodalab chiqamiz:

Tartiblangan juftliklar	Graflar	Matritsalar
$A_1 = \{<a,a>, <b,b>, <a,b>, <b,a>\}$		$\begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$
$A_2 = \{<a,a>\}$		$\begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix}$
$A_3 = \{<b,b>\}$		$\begin{pmatrix} 0 & 0 \\ 0 & 1 \end{pmatrix}$
$A_4 = \{<a,b>\}$	$a \longrightarrow b$	$\begin{pmatrix} 0 & 1 \\ 0 & 0 \end{pmatrix}$
$A_5 = \{<b,a>\}$	$a \longleftarrow b$	$\begin{pmatrix} 0 & 0 \\ 1 & 0 \end{pmatrix}$

$A_6 = \{< a,a >, < b,b >\}$		$\begin{pmatrix}1 & 0\\0 & 1\end{pmatrix}$
$A_7 = \{< a,a >, < a,b >\}$		$\begin{pmatrix}1 & 1\\0 & 0\end{pmatrix}$
$A_8 = \{< a,a >, < b,a >\}$		$\begin{pmatrix}1 & 0\\1 & 0\end{pmatrix}$
$A_9 = \{< b,b >, < a,b >\}$		$\begin{pmatrix}0 & 1\\0 & 1\end{pmatrix}$
$A_{10} = \{< b,b >, < b,a >\}$		$\begin{pmatrix}0 & 0\\1 & 1\end{pmatrix}$
$A_{11} = \{< a,b >, < b,a >\}$		$\begin{pmatrix}0 & 1\\1 & 0\end{pmatrix}$
$A_{12} = \{< a,a >, < b,b >, < a,b >\}$		$\begin{pmatrix}1 & 1\\0 & 1\end{pmatrix}$
$A_{13} = \{< a,a >, < b,b >, < b,a >\}$		$\begin{pmatrix}1 & 0\\1 & 1\end{pmatrix}$
$A_{14} = \{< b,b >, < a,b >, < b,a >\}$		$\begin{pmatrix}0 & 1\\1 & 1\end{pmatrix}$
$A_{15} = \{< a,a >, < a,b >, < b,a >\}$		$\begin{pmatrix}1 & 1\\1 & 0\end{pmatrix}$

Ko’rinadiki bu to’plamda 15 ta binar munosabat bo’lib bulardan 4 tasi ya’ni A_1, A_6, A_{11}, A_{12} lar *refleksiv*, 4 tasi ya’ni A_1, A_{13}, A_{14}, A_{15}*simmetrik*, 3 tasi ya’ni A_1, A_{13}, A_{14} lar *tranzitiv* munosabatlardir. Bundan kelib chiqadiki 1 ta A_1*ekvivalentlik* munosabatidir.

Xulosa qilib aytganda binar munosabatlarni 3 xil usuldan biridan foydalanib tasvirlashimiz mumkin. Ko’p hollarda matritsa usuli qulay hisoblanadi.

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THE STATE OF THE WORLD'S FUEL AND ENERGY BALANCE AND THE COAL MINES OF UZBEKISTAN

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Abstract:*in this statement it shows that the energy and fuel balance of the world in last century and nowadays. Also it explains that the improving coal mines in 5 years in Uzbekistan.*

Key words:*energy and fuel balance, coal, mining, oil.*

The problem of energy supply has always been in the eyes of mankind, and its unique issues have been manifested in every historical period.

At the beginning of the 20th century, coal (65%), firewood (16%), plant and animal waste (16%) were widely used in the world balance. The share of oil in the fuel balance was only 3%. Natural gas was not used at all.

By the 30s of the 20th century, the share of coal in the energy balance decreased (55%), the share of oil increased (15%), and combustible gases began to be used (3%).

Later (1960s and 1980s), as a result of the increase in the use of fuel and energy resources, the structure of the energy balance changed dramatically.

As a result, the share of oil increased by 1.35 times and the share of gas by 1.56 times, while the share of solid fuel decreased by 1.7 times. During this period, the use of all types of fuel and energy resources increased by 2.4 times and amounted to approximately 10.5 billion. t arranged conditional fuel.

In recent years, the use of coal on the world scale has been growing faster than the use of energy in general. In the 1980s, in general, the use of energy (compared to 1970) increased by 17%, while the use of coal was 26%.

Currently, the share of coal and oil in the world energy balance (in terms of production and use) is equal to each other.

In the future, it is planned to increase the production of solid fuel (coal, combustible shale, peat) deposits. Because they account for 90% of world reserves, and only 7% of oil and gas reserves. If their combustion heat is taken into account, then the share of solid fuels is 74%, and the share of gas and oil is 26%.

Currently, the number of underground coal pools and mines is more than 3,600. Seven of them are giant basins, and each of them has a geological reserve of 500 billion. is more than a ton. They include: Lensk, Tungusk, Taimirsk, Konsko-Achinsk, Kuznetsk (Russia), Alma-Amazonka (Brazil), Apalchansk (USA). Reserves of four basins - Nizhnereinsko-Westfalsk (FRG), Donetsk (Ukraine), Pechersk (Russia), Illinois (USA) basins

are 200-500 billion. makes tons. About 210 basins and mines each have reserves of 0.5200 billion. tons. Reserves of all remaining coal basins and mines are 0.5 billion. does not exceed a ton.

Coal and lignite reserves are distributed by continents as follows: Asia - 57%, America - 30%, Europe - 9%, Australia and Africa - 2% each.

In the Republic of Uzbekistan, coal is one of the main sources of energy and an important raw material for other industries. Coal mines located on the territory of the country and having large coal reserves will make it possible to further increase the volume of coal mining in the future.

In coal mining enterprises (mines and pits), various methods and excavation systems, as well as mechanization tools, are widely used to open the mine area and prepare it for digging. However, the technical level of the production processes of the existing enterprises and the main technical and economic indicators are much lower than the indicators of the developed coal mining regions of the CIS countries. Therefore, it is necessary to constantly improve coal mining.

At present, a number of coal deposits have been discovered in Uzbekistan, and research work has been carried out and is being carried out. These include Angren coal mine, Shargun coal mine, Boysun coal mine and others.

Angren coal mine is located in the Angren river valley of Tashkent region, its area is 70 km2 and it is the largest coal basin in terms of reserves. Shargun and Boysun coal mines are located in the mountainous regions of Surkhandarya region, and the geological and mining-technical conditions are quite complex. Due to the high quality of the coal of these mines, it is of great importance in the national economy of the republic.

The reserves of coal mines located in the territory of the Republic of Uzbekistan create great opportunities for the development of the country's national economy.

In addition to the coal mines mentioned above, the Kogurtong coal mine located on the borders of Uzbekistan and Turkmenistan is also of great importance. This mine is located 110 km north of the city of Termiz and 50 km from the "Bozir" railway station. In 1940-1957, the part of this mine located close to the surface of the earth was mined by local industrial mines, and now it is conserved.

The geological and hydrogeological conditions of the mine and the good quality of the coal will ensure the efficiency of its use in the future. The search and exploration of new coal mines continues in the territory of the republic.

Uzbekistan intends to increase the volumes of coal mining 3.1 times by shaft method in the next five years. It is expected that by the end of 2017, the country will produce up to 3.92 million tons of solid fuel, while in 2019 the indicator is projected to reach 4.78 million tons, and as much as 11.67 million tons in 2021. Last year, 3.87 million tons of coal was extracted in the country.

In general, it is intended to invest $690.5 million in the development and modernization of the coal industry in 2017-2021. The measures will be taken under six

investment projects. Major sources of funding include the Fund for the Reconstruction and Development of Uzbekistan with $68.7 million, and soft loans of the Shanghai Cooperation Organization in the amount of $378.7 million, $155.6 million of loans of Uzbek commercial banks, and $87.5 million of private funds of enterprises.

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