

Geometric Letters for the Blind and the Sighted

The Teacher's Book

Table_of_Contents

Introduction: The Arabic letters from Phoenician to Geometric Letters	1
Lesson 1- Un-dotted short Arabic Geometric Phonetic Letters	2
Lesson 2- Arabic Geometric Movements and Marks.....	3
Lesson 3- Long Un-dotted Arabic Geometric Consonant Letters	4
Lesson 4- Writing words with un-dotted geometric letters	5
Lesson 5- Short and Long Dotted Geometric Letters	6
Lesson 6- Geometric Letters from the dotted corners of the square	7
Lesson 7- Matching Geometric letters with the dots of two joined squares	8
Lesson 8- Matching Braille Codes with Latin and Geometric Letters (Line 1)	9
Lesson 9- Matching Braille Codes with Latin and Geometric letters (Line 2 & 3)	10
Lesson 10- Matching Braille Codes with Latin and Geometric Letters (Line 3)	11
Lesson 11- Matching Braille Codes with Latin and Geometric Letters (Line 4)	12
Lesson 12- Matching Braille Codes with Latin and Geometric Letters (Line 5 & 6)	13
Lesson 13- Matching { brAy} Codes with Latin and Arabic Letters	14
Lesson 14- Matching { brAy} Codes with Latin and Arabic Geometric Letters	15
Lesson 15- Matching { brAy} Codes with Reversed Geometric Letters {Taham}	16
Lesson 16- Matching { brAy} Codes with {brAy} Letters	17
Lesson 17- Matching { brAy} Codes with Reversed {brAy} Letters {brAym}	18

(Geometric letters are a simplified version of Arabic letters, aiming for universality like Arabic numerals.)

Introduction: The Arabic letters from Phoenician to Geometric Letters

The ancient Semitic alphabets had **22 consonant letters** (sounds) without dots or diacritics, and used in many Semitic languages such as the Canaanite, the Phoenician, the Aramaic, the Hebrew and the Arabic. **Unwritten movements** were used in speaking to launch the sounds of these letters from the mouth.

The **first Arabic historical step** was the **development of the Arabic letters by dotting some of them** and by the **addition of 6 dotted letters**: {th, kh, dh, D, Dh, gh} to have **28 letters, used also as numerals**: **9 ones**, **9 tens**, **9 hundreds** and **one thousand** for the last letter, to complete the old **Phoenician decimal system**.

(أ ب ج د ه و ز ح ط ي ك ل م ن س ع ف ص ق ر ش ت) (ث خ ذ ض ظ غ) = (أ ب ج د ه و ز ح ط ي ك ل م ن س ع ف ص ق ر ش ت) (ث خ ذ ض ظ غ) (أ ب ج د ه و ز ح ط ي ك ل م ن س ع ف ص ق ر ش ت) (ث خ ذ ض ظ غ)

The **second step** was the development of a new **Arabic Decimal Numeral System**, which captured the hearts and the minds all over the world, by introducing **9 numerals** based on the number of **fingers** or **angles** and the **Zero** as a **dot** or a **circle**, and by developing the science of **Arithmetic** and **Algebra**.

The Arabs distinguished between a **consonant letter** which is a **sound** that can be launched outside the mouth by a **movement** of the front of the mouth in a specific direction within a specific short or long period of time, before it disappears in the ear. They recognized **3 optional short movements** (**Fathah**, **Dummah**, **Kasrah**) and **3 mandatory long movements** (**Mad Fath**, **Mad Dum**, **Mad Kasr**), called **Mudood**, plural of Mad, in **Quran** and **Vowels in classic Arabic**, for launching the sound in three main directions: **upward** by opening the mouth, **forward** by rounding the lips, and **downward** by relaxing the lower jaw.

Horizontal symbols were written above the consonant letters in the case of **Fathah** and **Dummah**, and below them in the case of **Kasrah**. Three **consonant letters Alif, Waw and Yaa (a, w, y)** were used as long movements and called **vowel letters**. **Mad Fath** in Qur'an is frequently written as a **vertical Fathah**, as in **Allah**. The **Hamzah** was added to insure the **Alif sound**. The **shapes** of Arabic letters change according to their position in a word, whether they are at the beginning, in the middle, at the end, or isolated.

The Arabs also distinguished between **6 guttural consonant letters** (**Alif, Ha, Ha, Ayn, Kha, Ghayn**) and the **oral consonant letters**, which may be **Soft** with light sound as (**s, d, t, dh, k**) or **Hard** with heavy sound as (**S, D, T, Dh, K**). They realized that **Kasrah** can add **softness** to a consonant letter, as **L** in Bismillah, while **Fathah** and **Dummah** add **hardness**, as in **Allah** and **Hizbullah**.

The **Arabic geometric alphabet** consists of **28 consonant letters**, each letter has a single sound and unique shape including the letter **Alif** or the letter **Hamzah** and **6 vowels** including **3 horizontal short movements** and **3 vertical long movements**, above or below consonant letters or a connection of letters called **Waslah**. Geometric consonant letters include **13 un-dotted** letters: **6 short letters** based on the shape of a square and **7 long letters** based on the shape of two vertically joined squares, and **15 dotted letters** made by adding one, two or three dots above or below some un-dotted letters as follows:

(أ ب ج د ه و ز ح ط ي ك ل م ن س ع ف ص ق ر ش ت) (ث خ ذ ض ظ غ) (أ ب ج د ه و ز ح ط ي ك ل م ن س ع ف ص ق ر ش ت) (ث خ ذ ض ظ غ) (أ ب ج د ه و ز ح ط ي ك ل م ن س ع ف ص ق ر ش ت) (ث خ ذ ض ظ غ)

[Return](#)

Lesson 1- Un-dotted short Arabic Geometric Phonetic Letters

The **6** Arabic Geometric letters (**Alif, Meem, Ha, Ayn, Seen, Sad**), matching Latin letters by using writing Arabic way {wAw}, are formed by removing one or two sides from a square.

{wAw}: {s s q c m x} (أ، م، ح، ع، س، ص) (أ، م، ح، ع، س، ص)

1- The **geometric letter Alif** is the **right angle** formed by removing the left and upper sides of a square. The phonetic **letter Hamzah (ﺀ)** consists of **Hamzah mark above the angle** can have all the short and long movements (**Fatah, Dummah, Kasrah, Mad Fath, Mad Dum, Mad Kasr**):

{wAw}: {Ix Ux Ax ix ux ax} (اِءِ اُءِ اُءِ اِءِ اُءِ اِءِ) (اِءِ اُءِ اِءِ اِءِ اِءِ اِءِ)

Alif is phonetic At the beginning of a word, while **Alif without Hamzah is a long movement** in the rest of the word. The **Alif sound** is emanating from the back of the throat, the closest to the trachea where, the airflow from the lungs occurs. It is the easiest to pronounce and the first gasp of a newborn. **Hamzatu –lwasl** or **Waslah** can connect words, as in the following verse:

{imlcarr- inAmcarr- ihAll- imsib} (بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ - اَللّٰهُمَّ صَلِّ وَسَلِّمْ وَارْحَمْ عَلٰى سَيِّدِنَا مُحَمَّدٍ - اِنَّكَ رَحِيْمٌ)

The three consonant letter **Alif**, **Waw** and **Yaa** are also used as long movements called vowels in **classical Arabic** and in **Mudood** in the Quran (**Mad Fath**, **Mad Dum**, **Mad Kasr**). **Mad Fath** is written frequently in the Quran as a **vertical Fathah** as in the name of **God**.

Unfortunately, the Greek and Latin alphabets rejected **Alif** as a consonant letter (**sound**) and retained it as a vowel unless it is at the beginning of a word as in **apple** or **orange** where a **hidden phonetic Alif** is assumed. Therefore, these alphabets became non-phonetic and used International Phonetic Alphabets (API) to regulate pronunciation.

2- The letter Meem (م): is formed from a square.

3- The guttural letters Ha and Ayn (ع ح): are formed from a square open on the left and right.

4- The letters seen and Sad (س ص): are formed from a square open on the top and bottom.

Practical exercise-1: Drawing Un-Dotted Short Geometric Letters in Space or on Sand

The teacher stands in front of a group of blind and sighted children to imitate him. He explains how to write geometric letters on a house wall or in the open space of a tent and ask them to create the letters assuming a virtual square as follows:

1. Draw with your finger the lower right corner of a square (**Alif**) and the closed square (**Meem**).
2. Draw with your finger the open square on the left (**Ha**) , then on the right (**Ayn**).
3. Draw with your finger the open square on the top (**Seen**), then on the bottom (**Sad**).
4. Repeat the previous steps, but on the sand, in an open space, or on the beach.
5. The imaginary square in space is vertical, while the real square on the sand is horizontal.
6. The upper side of square in space is the farthest on sand and the lower side is the closest.
7. Each child is given a small koofiyyeh and a plastic bag containing sand to practice writing wherever he goes during displacement. Due to bombing, he can throw away the sand and keep the koofiyyah to protect his head from the heat or cold, or to wrap it around his middle to tighten his thin waist when carrying water or firewood for his family or to collect the remains of his people and comrades.

Return

Lesson 2- Arabic Geometric Movements and Marks

In Arabic, there are **three short vowels** called “**Movements**” (**Fathah, Dammah, Kasrah**) written above or below consonant letters and **three long vowels** called in the Quran “**Mudood**” (**Mad Fath, Mad Dum, Mad Kasr**), which share their written symbols with three consonant letters (ا, و, ي) as in the words (يَمِين, وَرُود, أَمَام), where the first letter is a consonant and the third is a long vowel.

In **Geometric method (Taha)**, the same symbols are written horizontally in case of short vowels and vertically in case of long vowels. They can be written above or below consonant letters and called “**Movements**” or after them above or below a letters connection called **Wasla** and called “**Vowels**”:

(I, U, A) (َ , ُ , ِ) - (i, u, a) (̄ , ̆ , ̇)

Short and long vowels are based on **two small squares** model, joined horizontally or vertically. All we need are two straight sides for **Fathah** and **Kasrah**, and a small square preceded by one side for **Dummah**. The small square represents the optional **Sukoon** mark, which indicates that a consonant letter is residing in the mouth. There are other **Arabic marks** in addition to the vowels that are (**Hamzah, Shaddah, Maddah, Tanween Fath, Tanween Dum, Tanween Kasr**) as follows:

(G) (ْ) - (~, W, x) (͡ , ͢ , ͣ) - (N, M, L) (ͤ , ͥ , ͦ)

The **Hamzah** mark resembles the **Dummah** after removing the right side. It is placed above the right angle of **Alif** to insure its role as a phonetic Arabic letter while the Latin letters, mixed up the vowels with the consonant letters and became un-phonetic alphabet. The **Shaddah** mark consists of two squares joined horizontally with removed upper sides and the **Maddah** mark differs from it in that one upper and one lower side are removed, symbolizing a longer vowel. **Tanween Fath** and **Tanween Kasr** consist of two stacked Fathah or Kasrah. **Tanween Dum** consists of a geometric Dummah with a vertical side added at the end.

When **matching geometric letters** with Latin letters, **Hamzatu -lwasl** is converted into a **Waslah**, the letter with **shaddah** is converted into double letter, and the letter with **Tanween** is converted into two letters, the first of which is with vowel and the second is (n), as follows:

(nidalab, nudalab, Anadalab) - (Ndalab, Mdalab, ALdalab), (sAnn- ibbar)
{nidalab, nudalab, Anadalab} - {Ndalab, Mdalab, ALdalab} (نِدَا، نُدَا، اِنْدَا), {sAnn- ibbar} (رَبِّ النَّاسِ)

Practical exercise-2: Drawing Short Un-dotted Geometric letters and Vowels

The teacher explains to the children how to write geometric vowels and marks and asks them to draw, in space or on sand, **short un-dotted geometric letters** with short or long vowels above or below these letters or after them above or below the letter connection (**Waslah**), as follows:

(َ □ , ُ □ , ِ □) (̄ □ , ̆ □ , ̇ □) (͡ □ , ͢ □ , ͣ □) (ͤ □ , ͥ □ , ͦ □)
(َ □ , ُ □ , ِ □) (̄ □ , ̆ □ , ̇ □) (͡ □ , ͢ □ , ͣ □) (ͤ □ , ͥ □ , ͦ □)
(َ □ , ُ □ , ِ □) (̄ □ , ̆ □ , ̇ □) (͡ □ , ͢ □ , ͣ □) (ͤ □ , ͥ □ , ͦ □)

[Return](#)

Lesson 3- Long Un-dotted Arabic Geometric Consonant Letters

The **7 long un-dotted geometric consonant letters** { **IA**, **rA**, **dAl**, **wAw**, **hA**, **lAm**, **kAf** } are based on the model of two vertically joined squares (**ب** , **ج** , **د** , **ز** , **ح** , **ط** , **ق**). They can be made by adding one side above the three short letters (**ا** , **و** , **ي**) to create three the long letters (**آ** , **أ** , **إ**) and by adding two sides to create two lower letters (**ج** , **ز**) and two upper letters (**ح** , **ط**). Geometric letters are used in Geometric Method (**Taha**) while uppercase and lowercase Latin matching letters { **lml** } are used in **writing Arabic way (wAw)** as follows:

(**ا** , **ح** , **م**) , (**ا** , **و** , **ي**) , (**ا** , **د** , **ط**) , (**ك** , **هـ**)
 (**h k**) - (**د** , **س**) , (**w r**) - (**ز** , **ج**) , (**T d l**) - (**ب** , **ل** , **ا**) , (**m c x**) - (**ا** , **و** , **ي**)

- 1- The 3 letters (**ا** , **و** , **ي**): are formed by adding one side above each of (**ا** , **و** , **ي**).
- 2- The 2 lower letters (**ج** , **ز**): are formed by adding two sides below each of (**ا** , **و**).
- 3- The 2 upper letters (**ح** , **ط**): are formed by adding two sides above each of (**ا** , **و**).

There are two arrangements of the 13 short and long un-dotted geometric Arabic letters (FRTL):

- 1- **Tardi** in 5 words: (**klhw drT** mS sq cx) - (**س** , **ج** , **ز** , **ح** , **ط**)
- 2- **Ahamadi** in 3 words and 3 letters: (q S s krwT lh dmcx) - (**ا** , **و** , **ي**)

Drawing Geometric Short and Long Vowels by Finger or Hand:

{ **I**, **U**, **A** } - (**ا** , **و** , **ي**) , { **i**, **u**, **a** } - (**ا** , **و** , **ي**)

The geometric **Fathah or Kasrah** is drawn by moving the index finger from right to left, two small sides above or below the letter. **Mad Fath or Mad Kasr** is drawn in the same way, but from top to bottom. The geometric **Dummah** is drawn from bottom to top to draw the small square clockwise, then continue with one side. **Mad Dum** is drawn in the same way, but we start from right to left.

There are other ways to draw and geometric letters on a wall, in space, such as moving a **wooden pen**, pointing with a **light pointer**, and using other modern educational tools if available.

The hand can also be used instead of the finger. **Fathah or Kasrah** is drawn by moving the outstretched hand horizontally up or down. **Mad Fath or Mad Kasr** is drawn in the same way, but with the outstretched hand vertically. **Dummah** is drawn by moving the closed hand horizontally forward. **Mad Dum** is drawn in the same way, but with the closed hand vertically.

Practical exercise-3: Drawing Long Un-dotted Geometric letters and Vowels

The teacher explains to the children how to write geometric vowels and asks them to draw, in space or on sand, **long un-dotted geometric letters** (**س** , **ج** , **ز** , **ح** , **ط**) with short or long vowels above or below these letters or the letters connection (**Waslah**) after them, as follows:

(**ا** , **و** , **ي**) (**ا** , **و** , **ي**) (**ا** , **و** , **ي**) (**ا** , **و** , **ي**)
 (**ا** , **و** , **ي**) (**ا** , **و** , **ي**) (**ا** , **و** , **ي**) (**ا** , **و** , **ي**)
 (**ا** , **و** , **ي**) (**ا** , **و** , **ي**) (**ا** , **و** , **ي**) (**ا** , **و** , **ي**)
 (**ا** , **و** , **ي**) (**ا** , **و** , **ي**) (**ا** , **و** , **ي**) (**ا** , **و** , **ي**)

[Return](#)

Lesson 4- Writing words with un-dotted geometric letters

There are **28** Arabic **consonant letters** including **22** Abjad letters shared in ancient Semitic languages such as Phoenician, Aramaic, Syrian, Hebrew, and Arabic, in addition to 6 Arabic letters {**th, kh, dh, D, Dh, gh**} added later to complete the decimal system to 9 letters for units (**1-9**), 9 letters for tens (**10-90**), 9 letters for hundreds (**100-900**), and one letter for the Alf (**1000**), as follows:

ع	خ	ظ	ض	ذ	خ	ث	ت	ش	ر	ق	ص	ف	ع	س	ن	م	ل	ك	ي	ط	ح	ز	و	ه	د	ج	ب	ا
G	ث	ظ	ض	ذ	خ	ث	ت	ش	ر	ق	ص	ف	ع	س	ن	م	ل	ك	ي	ط	ح	ز	و	ه	د	ج	ب	ا
L	Q	Z	D	P	C	B	t	F	r	K	S	f	q	s	n	m	l	y	k	T	c	z	w	h	d	j	b	x

Geometric Method {Taha} uses geometric letters while **writing Arabic way {wAw}** uses small and capital Latin matching letters {**lml**}. Three Arabic guttural letters (**Alif, Ha, Ayn**) which are not used in Latin have been matched with 3 redundant Latin letters (**x, c, q**) which have multiple sounds. These letters are replaced with other single sound letters in English texts using {**wAw**}.

Arabic language distinguishes **5 soft letters** with light sounds {**k s d t dh**} from corresponding **5 hard letters** with heavy sounds {**K S D T Dh**}. {**dha**} and not (the) is used in English as definition article written in {**wAw**}. **Kasrah (i)** adds softness to the consonant letter, such as the letter **L** in “Bismillah,” while **Fathah (a)** and **Dummah (u)** add hardness, as in “Allahu Akbar, Hizbullah”.

There are two types of Arabic letters: **dotted and un-dotted**, and two types of un-dotted letters arrangement: **Tardi and Ahmadi**. The **13 un-dotted letters** include **6 short letters**, all of which can be dotted, and **7 long letters**, of which only 3 letters (**d r T**) can be dotted, with one dot above each (**P z Z**) and 4 long letters (**k l h w**) cannot be dotted.

طردي: (أح عس صم طرد وهلك) - أحمدي: (أحمد هل طورك س ص ع)
 {طرد=ط, عس=ع, صم=ص, طرد=ط, وهلك=و, ه, ل, ك} - {أحمد=أ, ح, م, د, هل=ه, ل, طورك=ط, و, ر, ك, س, ص, ع}

Practical exercise-4: Drawing words with un-dotted geometric letters

The teacher explains to the children how to write geometric letters and movements on the wall of a house, in the open space or on the sand above or below the geometric consonant letters or after them and above or below the letters connection (**Waslah**).

He can explain to them that **words consist of a series of consonant letters and movements**. Then he can ask for volunteers to come forward to draw a name with un-dotted letters and asks them to draw other names and pronounce them as the following names:

أحمد حميد أسعد سعيد سالم وليد صالح حليم
 (أحمد=أ, ح, م, د) (حميد=ح, م, د) (أسعد=أ, س, ع, د) (سعيد=س, ع, د) (سالم=س, ل, م) (وليد=و, ل, د) (صالح=ص, ل, ح) (حليم=ح, ل, م)
 إسلام سليم أحلام كريم هلال وحيد سلام هديل
 (إسلام=إ, س, ل, م) (سليم=س, ل, م) (أحلام=أ, ح, ل, م) (كريم=ك, ر, م) (هلال=ه, ل, ل) (وحيد=و, ح, د) (سلام=س, ل, م) (هديل=ه, د, ل)

[Return](#)

Lesson 5- Short and Long Dotted Geometric Letters

There are 28 consonant Abjad Arabic letters grouped into 8 words . The last 6 {Taha} or {wAw} dotted letters had been added with the dawn of Islam: (ت ث د) (ظ ذ ط) - (gh Dh D) (dh kh th).

أبجد هوز حطي كلمن سعفص قرشت - ثخذ ضظغ

There are **13 un-dotted letters** include **6 short** letters based on the square model and grouped into **3 words**, and **7 long** letters based on the two vertically joined squares model and grouped into **2 words**. There are also **15 dotted letters** grouped into **5 words** as follows:

(أح عس صم) (طرد وهلك) - (بنت جيش قفر ثخذ ضظغ)
(ن ح ط ب ج د ه و ز ح ط ي ث ك خ د ذ ط ظ) - (ن ت ج ي ث ك خ د ذ ط ظ)

Short geometric letters accept up to three upper or lower dots. There are **15 dotted letters** listed below made by dotting as follows: **5** from the **square corner** (Alif), **5** from the **open squares**, **2** from the **closed square** and **3** from **3 long geometric letters** { d r T}. As for the tied **Taa** {R} at the end of a word, it is pronounced as **Haa** at stops and is not counted with the letters.

(پ ی ن ت ث) (چ ذ ز ع ح ط) (ق ک) (ط ظ) (ث ذ ط)

The **dotting of letters** marked the **first historical leap** in the development of the Arabic language. Simply adding a dot to six alphabetical letters enriched the Arabic alphabet **with six complementary letters** in order to complement the decimal numeral system as long as **Letters were used as numerals**. The Arabic decimal system, which used **28 letters**, appeared to be a strong competitor to the Roman system, which used only **7 Latin letters**.

The first generation of Arabic numerals was created, based on the shape and **number of fingers**, when the Arabs realized that the first nine letters could be used not only for units, but also for tens and hundreds, depending on the letter's position in the first, second, or third place. A dot called **Sifr (Zero)** was chosen to be written in the empty place. **The Arabic decimal system** proved to be the most powerful for performing mathematical calculations.

A second generation of Arabic numerals was then developed based on **the number of angles** instead of fingers, and a circular symbol with no angles was chosen for **Sifr (Zero)**. **The new Arabic decimal system** spread in France via Spain and conquered the hearts and the minds, and decrees were issued in to use the Arabic numerals (Les Chiffres Arabes) and quickly spread all over the world.

Practical exercise-5: drawing words with geometric letters and movements

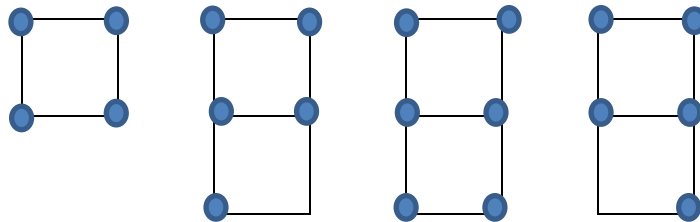
Repeat exercise-4 to draw the names of all participating children using all the geometric letters.

نظام (ن=ط=ا=م) تیسیر (ت=ی=س=ر) طارق (ط=ا=ر=ق) زیاد (ز=ی=ا=د) سلیمان (س=ل=ی=م=ا=ن) یحیی (ی=ح=ی) زکریا (ز=ک=ر=ی=ا) یعقوب (ی=ع=ق=و=ب)
جواد (ج=و=ا=د) یزن (ی=ز=ن) فارس (ف=ا=ر=س) أنس (ا=ن=س) عثمان (ع=ث=م=ا=ن) عائشة (ع=ا=ئ=ش=ة) نور (ن=و=ر) زيد (ز=ی=د)

[Return](#)

Lesson 6- Geometric Letters from the dotted corners of the square

What if we used, for blind children, the letters composed of dots by **dotting the intersections of the sides of a square**? We would obtain **16 different shapes** from **4 dots** as follows: **4 shapes** with one dot at each vertex, **6 shapes** with two dots at the ends of 4 sides and 2 diagonals, **4 shapes** with 3 dots for each corner, **one shape** with 4 dots at the 4 vertex points, and the **last shape** without dots.



If we were to mark the dots where the sides of the two adjacent squares meet, we would obtain from **6 dots** **64 different shapes**. We obtain additional 16 different shapes by adding the fifth dot or the sixth dot or the two dots together. These shapes can form a new alphabet. In fact, **French Braille** had preceded us to this idea and matched these 64 shapes with Latin letters.

Geometric letters aiming for universality must be matched to the **Latin and Braille alphabets**.

When the Latin letters arranged in words and compared to **Abjad words**, we find similarities in three words (**ABCD, KLMN, QRST**) and differences in the last six additive letters (**UVW XYZ**).

(أبجد الإفج - كلمن أب قرست -) (أبجد هوز حطي - كلمن سعفص قر - شت تخذ ضظغ)
ABCD EFG HIJ - KLMN OP QRST - UVW XYZ

Short and long Arabic movements are matched with small and capital Latin vowels. The two short vowels (**e, o**) are not used in Arabic classic and the two long vowels (**E, O**) were replaced by a short movement (**a**) followed by (**y**) or, (**w**) as in (**layl, nawm**) instead of {**lEl, nOm**}.

(A, U, I, E, O) (a, u, i, e, o) - (ٲ , ٲ , ٲ , ٲ , ٲ) (ٲ , ٲ , ٲ , ٲ , ٲ)

We **add 4 English consonant letters** missing in Arabic (**ch v g p**), and **match 3 Arabic letters** (**Hamzah, Ha, and Ayn**), missing in English, with **3 Latin poly sound letters** (**x, c, q**). We also match **5 English compound letters** and **5 Arabic hard letters** with **10 capital Latin letters**. Different lowercase and uppercase Latin matching letters (**lml**) are used in writing Arabic way (**wAw**).

(H/ch v g p) (ٲ , ٲ , ٲ , ٲ) - (أ ح ع) (q c x) (ٲ , ٲ , ٲ)
 (dh th sh kh gh) (**P B F C Q**) (ٲ , ٲ , ٲ , ٲ , ٲ) - (ق ص ض ط ظ) (**Z T D S K**) (ٲ , ٲ , ٲ , ٲ , ٲ)

Practical Exercise 6: The dots of the square and the two joined squares

The teacher explains how to create **16 shapes from the 4 dots** of a square and **64 shapes from the 6 dots** of the 2 joined squares and asks how many shapes there are from one, two, three, or four dots in a dotted square, and requests from children to draw them in space or on a sandy surface.

[Return](#)

Lesson 7- Matching Geometric letters with the dots of two joined squares

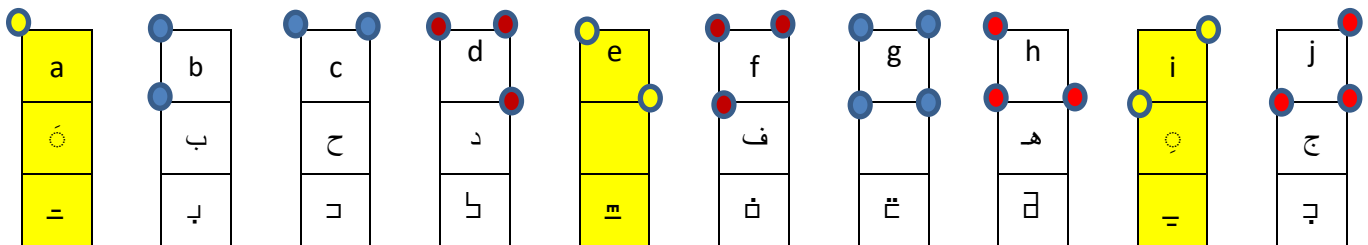
Geometric phonetic letters are a very simplified version of Arabic letters. They are based on the **sides of a square model** or the **sides of two joined squares model**. Movements may be written after the geometric phonetic letters above the letters connection (**Waslah**). **Braille codes** are a very simplified version of geometric letters and subsequent movements based on shapes made from the dots where the sides of the two above mentioned models meet.

Braille had combined the two models into what is known as the **Braille cell**. This is an array of two columns from left to right and three rows from top to bottom, containing **six primary cells** which can contain **6 dots** arranged and numbered in the **first column** as (1, 2, 3) and in the **second column** as (4, 5, 6). He arranged the possible **64 Braille codes** of primary cells into seven rows of 10 dotted codes each. **The first row** contains 10 codes in the **top primary cells (1, 2, 4, 5)**. Then, he repeated the same codes arrangement **in the second, third, and fourth rows**, but with **dots in cells (3), (3, 6), and (6)**, respectively.

Braille matched the **20 codes of the first two lines** with the **20 lowercase Latin letters (abcd efg hij)** and **(klmn opqrst)** and the first **5 codes of the third line** with the **next 5 lowercase Latin letters (uvxyz)**. The letter (**w**) which was not present initially. Braille introduced a **special numeral code (#)** to convert the codes on the first line into numerals (**1-9,0**).

Unified Braille letters {**brAy**} matching geometric letters {**Taha**}, correspond to the **Braille alphabet** matching **lowercase Latin letters** arranged in the first 3 lines of **10 letters each** that include **5 short vowels and 20 soft consonant letters**. Long vowels, hard and combined consonants letters are corresponding to {**wAw**} **uppercase Latin letters** in the following lines .

To match **Arabic geometric letters** with **Latin letters** and **Braille codes**, we match the extra letter (**c**) with the missing letter (**Ha**), the short vowel **Kashah (e)** with the **inverted Shaddah**, and the letter (**g**) with a **dotted Ghayn in the first line**. **On the second line**, we match the short vowel **Offah (o)** with the **inverted Dummah**, the letter (**p**) with the dotted (**Ya**), and the extra letter (**q**) with the missing letter (**Ayn**). **On the third line**, we match the extra (**x**) with the missing letter (**Alif**) and insert the lowercase consonant letter (**w**) at the end of the line.



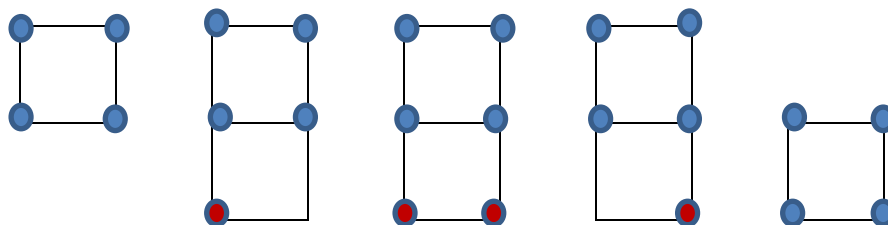
Practical exercise -7: The 10 dotted letters at the 4 vertex of the square (Braille first line)

The teacher explains how and why Braille had chosen **10 dotted shapes** from among **16 possible shapes** and asks children to memorize the first 10 English letters (**abcd efg hij**), comprising **7 consonant letters** and **3 vowels**, and to draw their codes in the space or on a sandy surface.

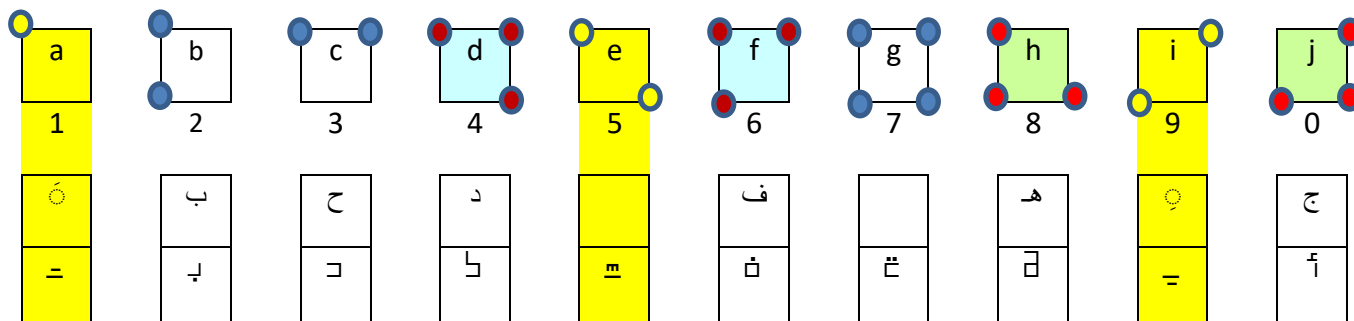
[Return](#)

Lesson 8- Matching Braille Codes with Latin and Geometric Letters (Line 1)

A **Braille cell** is a two-column, three-row array containing **six primary cells**, each containing a dot. Each dot has its own number. The dots in the **first column** are (1, 2, 3), and the dots in the **second column** are (4, 5, 6) from top to bottom and left to right. The **Braille cell** provides **64 dot codes** arranged in seven rows of 10 codes each. *The first row* contains 10 different codes in the **top four primary cells (1, 2, 4, 5)** out of a total of 16 possible codes. The **second, third, and fourth rows** each contain these same 10 codes of the first row, but with dots in the primary cells (3), (3, 6), (6) respectively. The **fifth row** contains the same codes as the first row in the **bottom four primary cells (2, 3, 5, 6)**. The **sixth and seventh rows** contain the remaining 14 codes.



Braille matched the **10 codes of the first line** with the first 10 lowercase Latin letters (**abcd efghij**) and with 10 numbers (**1-9, 0**), starting with the **vowel (a)** and the number (1) made from one dot, then **two consonant letters (b, c)** or the **two numbers (2, 3)** made from 2 dots each.



In the center of the next seven letters is the letter (**g**) and the number (**7**) with four dots. To its left and right are **two consonant letters** with three dots each, and between them is a **vowel** with two dots: (**def**) with numbers (4, 5, 6) and (**hij**) with numbers (8, 9, 0). **The codes of consonant letters (d, f, j, h) and the even numbers (4, 6, 8, 0) represent 4 corners of a square**, starting from the top right corner and proceeding counterclockwise, while **the codes of the vowels (e, i) and the odd numbers (5, 9) represent 2 descending and ascending diagonals**.

Practical Exercise- 8: Braille or {brAy} codes – Line 1

The teacher explains how to **memorize the Braille codes on the first line**, which correspond to 10 English letters (**abc def g hij**), including **7 consonant letters** and **3 vowels**. He then asks the children to trace their dotted codes with their right index finger on their left palm, in space, or on the sand.

[Return](#)

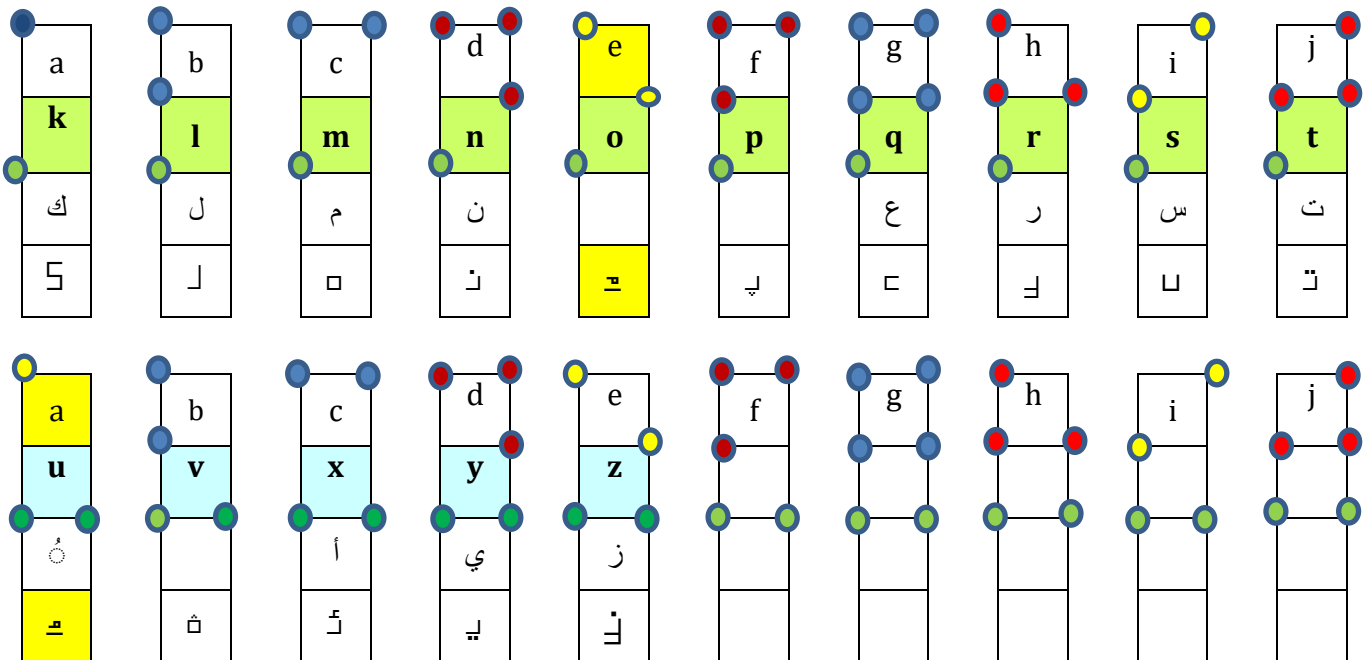
Lesson 9- Matching Braille Codes with Latin and Geometric letters (Line 2 & 3)

The **model of two dotted joined squares** corresponds perfectly to a **Braille cell**, which is a (3x2) array used to create the geometric letters (**Taha**) from the **sides** to write the texts **from right to left** and to create Braille codes {**brAy**} from the **dots** to write **from left to right**.

To write Arabic text from right to left, the Braille cell and its dots are reversed so that the first column is on the right and the second column is on the left. The numbering of the primary cells remains unchanged. **Arabic text** is written from right to left using geometric letters (**Taha**) or the matching Latin letters (**lml**) or the reversed {**brAy**} letters {**brAym**}.

To write English text from left to right using writing Arabic way {**wAw**}, geometric letters (**Taha**) are reversed into (**Taham**) which correspond to Latin matching letters (**lml**), or {**brAy**} letters. **French text**, requires four additional specific oral vowels and four nasal vowels.

Braille repeated the same **10 codes of the first line** in the **second line**, but added dot number (3), and matched them with the next **10 lowercase Latin letters (klmn opqrst)**. He repeated the same in the **third line** but added the dots number (3, 6), and matched the **first 5 codes of them** with the next **5 lowercase Latin letters (uvxyz)** excluding (**w**), which was not present.



Practical Exercise- 9: Braille or {brAy} codes – Line 2 and half Line 3

The teacher explains to children how to memorize the **codes on the second and third lines for 15 English letters (klmn opqrst) and (uvxyz)** compared to **the codes of the first line**. They are asked to trace these dotted letters with their right index finger on their left palm, in space, or on a sandy surface.

[Return](#)

Lesson 10- Matching Braille Codes with Latin and Geometric Letters (Line 3)

In **writing Arabic way** {wAw}, the name of **French** inventor **Braille** is pronounced and written and as {brAy} were the **vowel** (a) is a long movement {A} and the syllable "ille" is a **consonant letter** {y}. While, the **English** word Braille is written and pronounced as {brEl}.

{brAy} codes correspond to **lowercase Latin letters** matching soft geometric letters and short geometric movements and to **uppercase Latin letters** matching hard geometric letters not found in Latin or composed letters, and long geometric movements. The 3 **poly sound letters** Latin (x, c, q) were substituted by 3 Arabic **guttural letters** (Alif, Ha, Ayn) not found in Latin.

The **letters (j, y, w)** were added to the Latin alphabet in later periods. (y) was derived from the Greek consonant letter (**Iota**), which was written (**Jota**). When the letter (j) was added to Latin, it became confused with the letter (i). The letter (y) was called (**i grec**) in French and {wAy} in English. It was confused with the letter (i), as in the word (**cycle**).

The **consonant Latin letter (w)**, called {wAw} in Arabic or [vAv] in Hebrew is used also as a **long movement called (Mad Dum)** as in (Dawwd) or (Davvd) and finally (**David**). Initially, the consonant letter (v) was used also as a movement as in (**JVLIVS**). Then the letter (u) was added, and the two letters became confused. When it was decided that (v) is a consonant letter and (u) is a vowel, the **consonant letter (w)** was formed from two combined (v)s. It is called **double (v)** in French and **double (u)** in English. The **long movement** became 'oo' or 'ou' in French.

Braille introduced the symbol (#) to be written before the lowercase Latin letters in the first line to convert them into numerals. {brAy} assigned different roles to uppercase Latin letters.

In the **2nd half of the 3rd line**, 5 uppercase Latin letters (**S, Z, K, P, T**) were matched with 5 hard Arabic letters (**Ṣ, Ḍh, Ḳ, dh, Ṭ**) not found in Latin except soft (dh) which is different from (th).

Practical Exercise-10: Braille or {brAy} codes – Line 3, 2nd half

The teacher explains to children how to memorize the codes in the **2nd half of the 3rd line** by matching 5 uppercase Latin letters (**S, Z/Dh, K, P/dh, T**) with 5 hard Arabic letters not found in Latin except (**dh**) which is different from (**th**). They are then asked to draw these codes with their right index finger on their left palm, in space, or on a sandy surface.

[Return](#)

Lesson 11- Matching Braille Codes with Latin and Geometric Letters (Line 4)

Braille introduced a special symbol to convert a lowercase to an uppercase Latin letter if written before it, while **{brAy}** assigned Different **codes** and **roles** to uppercase Latin letters matching Arabic letters. **In the 4th line**, the uppercase Latin letter (**H**) was matched with a compound English letter not used in classical Arabic (**ch**). It is pronounced like Iraqi (k).

Additionally, **5 capital Latin letters (Q, F, B, C, D)** were matched with 4 Arabic letters (**gh, sh, th, kh**) used as English compound letters, and with the hard Arabic letter **{Dad}**, as well as **3 capital Latin vowels (I, U, O)** with 3 long Arabic movements (**Mad Kasr, Mad Dum, Mad Off**). The Latin letter (**w**) was matched with the Arabic consonant letter **{wAw}**.

a	b	c	d	e	f	g	h	i	j
H	Q	F	B	C	D	I	U	O	w
ch	gh	sh	th	kh	ض	مد كسر	مد ضم	مد أوف	و
٢	ع	ش	ث	خ	ض	ت	ا	ك	و

The Arabs discarded two short Phoenician movements, **Kashah** and **Offah (e, o)**, and two long movements, **Mad Kash** and **Mad Off {E, O}**, while the Greeks retained them as (**epsilon, omicron**) and (**Eta, Omega**). The Romans imitated the Greeks. The consonant letter (**H**), used as a Greek vowel (**Eta**), appears silent in French and Phonetic in English as in the common word "**hotel**". It is used also in combined consonant letters as (**ph**), (**ch**), (**sh**) etc....

The **Greeks** and the **Romans** transformed the **consonant letter (Aleph)** into a vowel (**Alpha**), or (**A**). However, a hidden Aleph sound is pronounced in any word beginning with a Latin vowel, as in **Apple** or **Orange**. The Arabs added the **Hamzah** to emphasize the Aleph sound.

The Romans wrote down the 5 unwritten Phoenician vowels (**Fathah, Dummah, Kasrah, Kashah, Offah**) (**a, u, i, e, o**), but these were often confused, as in the English words (**mall, sun, out**), where (**a, u, o, u**) became **{O, a, a}** and consonant **{w}**. Similarly, in the French words (**le mur, Braille**), (**e, u, a, i**) became **{u, lu, A}** and consonant **{y}**. Therefore, the International Phonetic Alphabets (**IPA**) were developed to standardize pronunciation.

Practical Exercise-11: Braille or {brAy} codes – Line 4

The teacher explains how to memorize the codes on the 4th line by matching **9 capital Latin letters (H, Q, F, B, C, D, I, U, O)** and small (**w**) with **5 Arabic/English letters (ch, gh, sh, th, kh)**, with **2 Arabic letters {Dad, wAw}** and **the 3 long movements (Mad Kasr, Mad Dum, Mad Off)**. The n he asks the children to draw codes with their index finger on their left palm, in space or on sand.

[Return](#)

Lesson 12- Matching Braille Codes with Latin and Geometric Letters (Line 5 & 6)

For matching Latin letters with geometric letters and the corresponding {brAy} letters, the roles assigned to Latin uppercase letters are different from those of lowercase letters.

In the 4th line, 9 uppercase Latin letters (H, Q, F, B, C, D, I, U, O) and one lowercase letter (w) were matched with 5 Arabic consonant letters used as compound letters in English (ch, gh, sh, th, kh), 2 Arabic consonant letters {Dad, wAw}, and with 3 long Arabic movements (Mudood).

In the 5th line, the Braille codes in the upper primary cells number (1, 2, 4, 5) of the first line were moved to the lower primary cells number (2, 3, 5, 6). The first 7 Braille codes were matched to 7 common characters (comma, semicolon, colon, period, question mark, exclamation mark, and parenthesis). The next 3 Braille codes were matched to 3 capital Latin letters (L, M, N) and to three Arabic marks (Tanween Fath, Tanween Dum, Tanween Kasr) or to three French nasal vowels (Naf Fath, Naf Dum, Naf Kasr).

1 a	2 b	3 c	4 d	5 e	6 f	7 g	8 h	9 i	0 j
,	;	:	.	?	!	)	L	M	N
,	;	:	.	?	!	)	◌̣	◌̤	◌̥
,	;	:	.	?	!	)	◌̣	◌̤	◌̥

In the 6th line, 8 Braille codes were matched with capital Latin letters (A, E, X, Y, J, R, G, W) or with 2 long movements (Mad Fath, Mad Kash), 4 optional Arabic letters or French vowels and 2 marks (Sukoon or French vowel, Shaddah). The last 2 Braille codes were matched with (#) and Waslah.

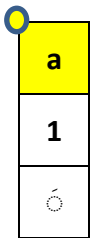
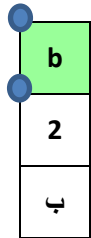
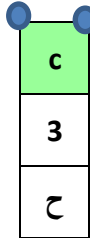
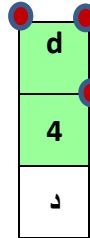
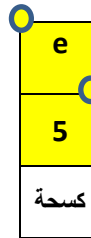
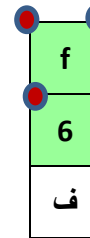
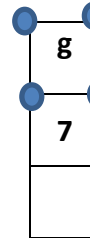
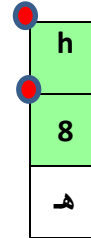
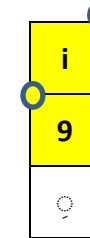
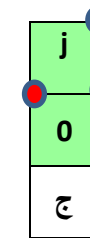
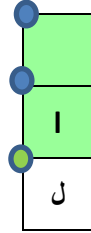
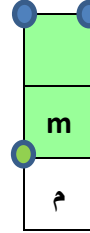
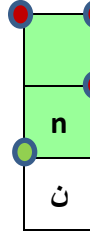
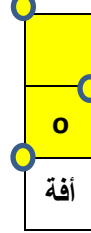
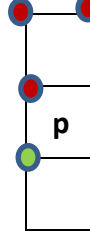
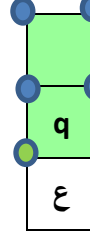
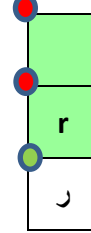
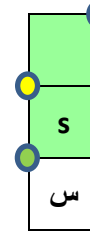
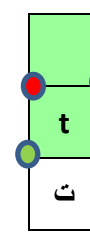
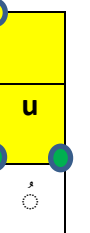
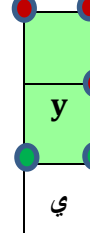
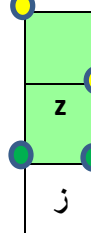
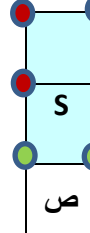
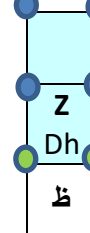
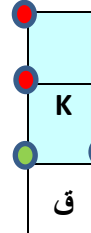
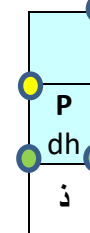
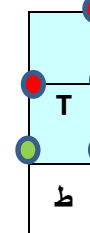
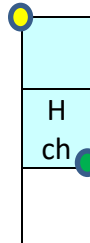
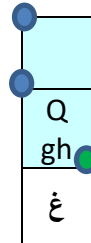
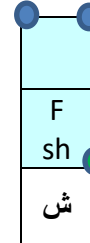
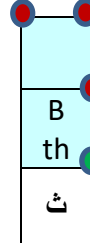
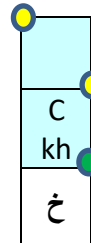
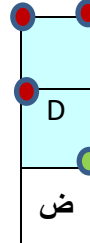
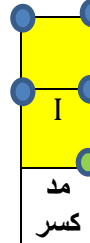
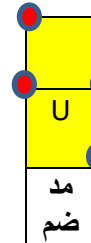
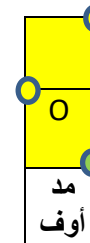
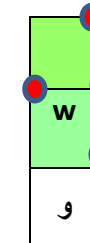
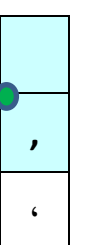
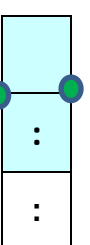
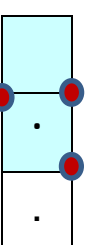
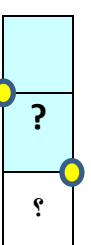
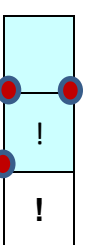
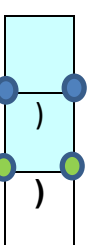
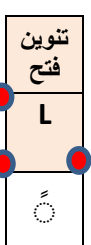
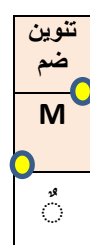
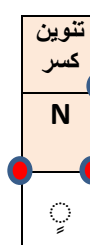
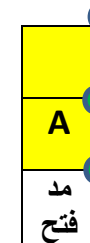
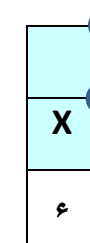
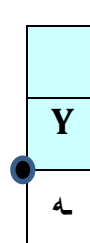
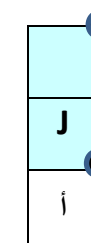
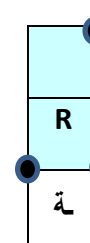
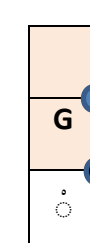
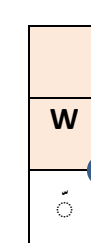
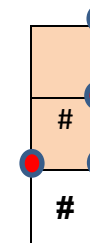
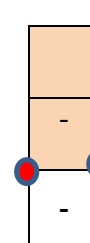
A	E	X	Y	J	R	G	W	#	-
مد فتح	مد كسح	ء	هـ	أ	آ	◌̣	◌̤	#	-
أ	آ	ء	هـ	أ	آ	◌̣	◌̤	#	-

Practical Exercise-12: Braille or {brAy} codes (Line 5 & 6)

The teacher explains to students how to match 10 Braille codes on the 5th line with 7 characters , ; : . ? !) and 3 uppercase Latin letters (L, M, N) or 3 Arabic Tanween marks. Also, 8 Braille codes on the 6th line with 8 uppercase Latin letters (A, E, X, Y, J, R, G, W), or with 2 long Arabic movements (Mad Fath, Mad Kash), 4 optional Arabic letters, Sukoon and Shaddah. The last 2 codes are matched with the numeric symbol (#) and the Waslah. Finally, they are asked to draw these codes as usual.

[Return](#)

Lesson 13- Matching { brAy} Codes with Latin and Arabic Letters

									
1	2	3	4	5	6	7	8	9	0
اَ	ب	ح	د	كسحة	ف		هـ	يَ	ج
									
ك	ل	م	ن	أفة		ع	ر	س	ت
									
اُ		أ	ي	ز	ص	ظ	ق	ذ	ط
									
ch	gh	sh	th	kh		مد كسر	مد ضم	مد أوف	و
									
,	؛	:	.	؟	!	)	اَ	اُ	اِ
									
مد فتح	مد كسح	ء	هـ	أ	ة	اَ	اَ	#	-

Note: The 8 Latin letters (L M X Y J R G) share the match with Arabic and French letters.

[Return](#)

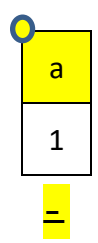
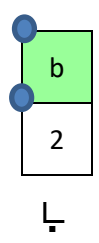
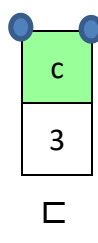
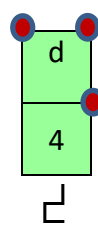
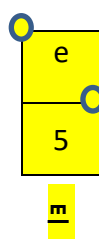
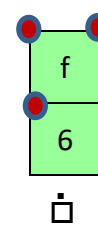
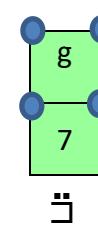
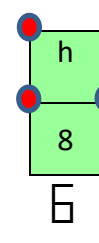
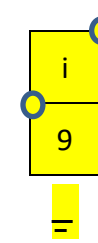
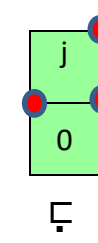
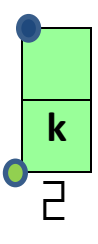
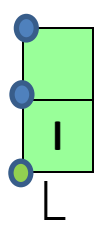
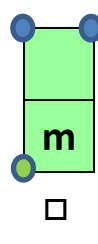
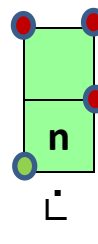
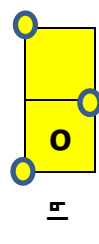
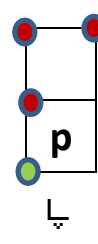
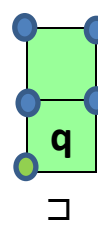
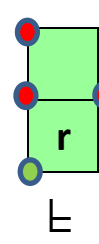
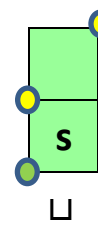
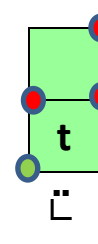
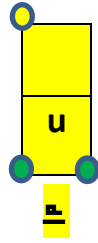
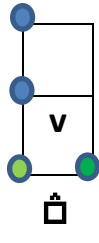
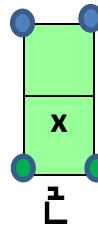
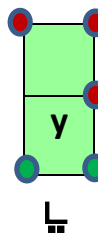
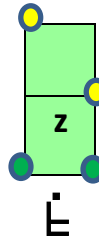
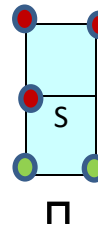
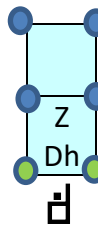
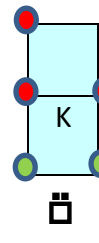
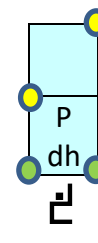
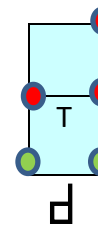
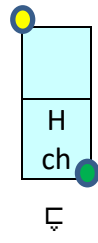
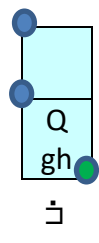
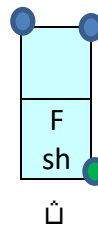
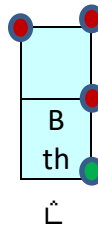
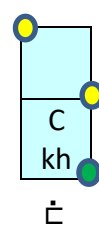
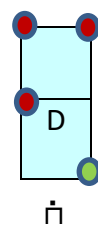
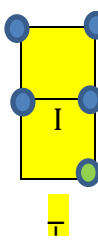
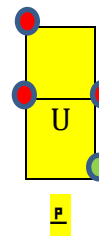
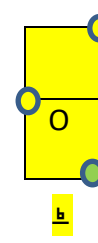
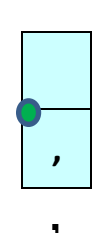
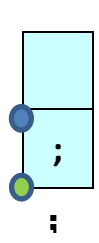
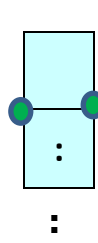
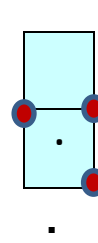
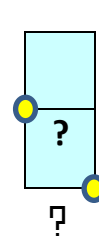
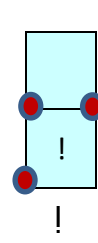
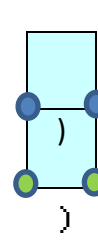
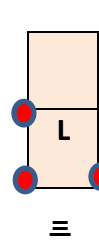
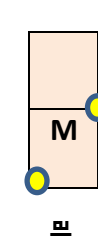
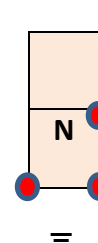
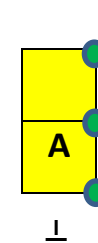
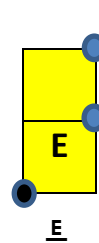
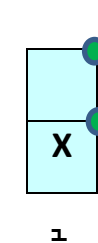
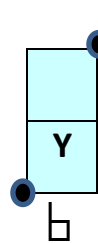
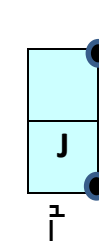
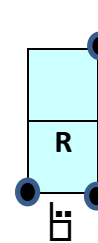
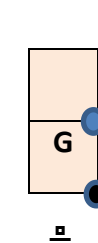
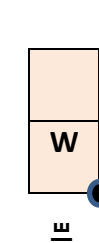
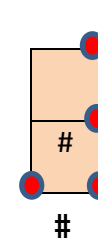
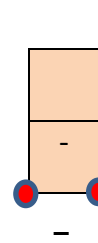
Lesson 14- Matching { brAy} Codes with Latin and Arabic Geometric Letters

Tan. : Tanween

Note: The Latin Letters (X Y J R L M N G) could be matched with 4 oral and 4 nasal specific French vowels.

[Return](#)

Lesson 15- Matching { brAy} Codes with Reversed Geometric Letters {Taham}

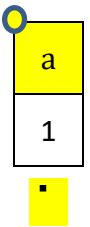
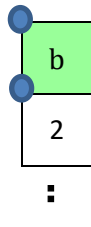
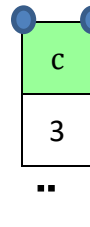
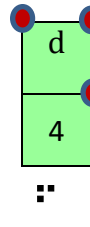
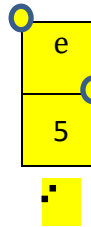
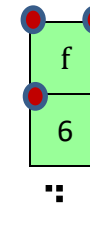
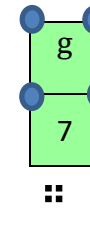
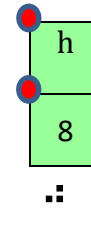
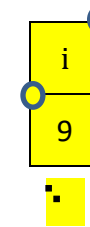
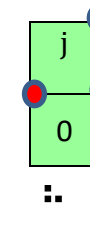
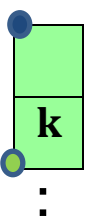
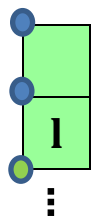
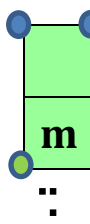
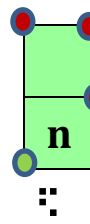
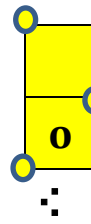
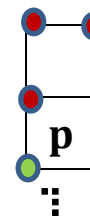
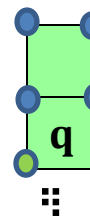
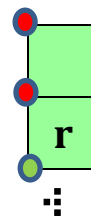
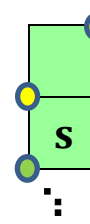
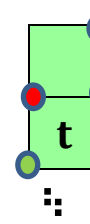
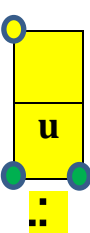
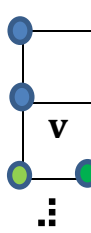
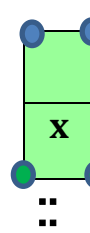
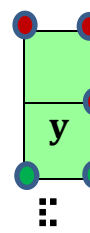
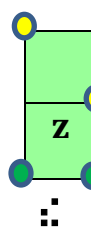
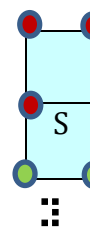
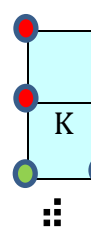
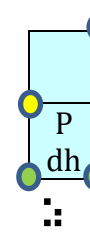
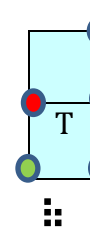
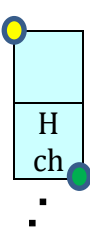
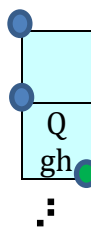
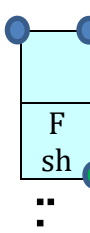
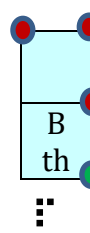
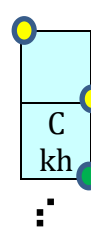
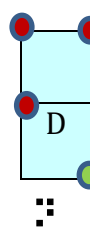
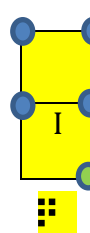
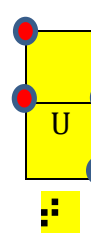
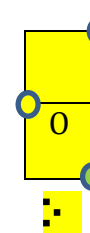
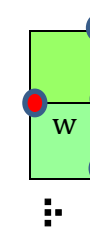
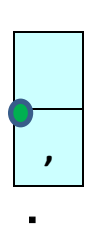
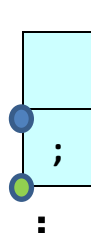
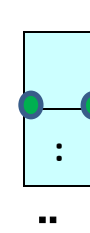
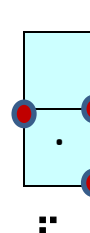
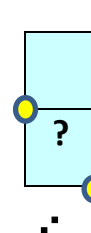
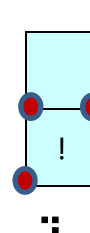
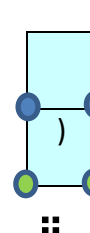
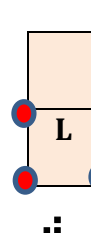
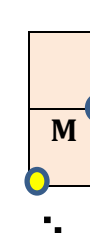
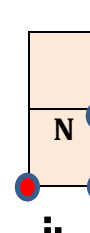
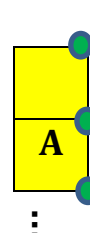
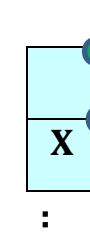
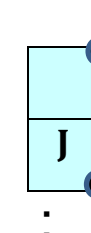
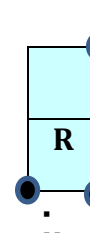
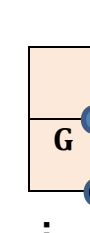
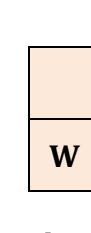
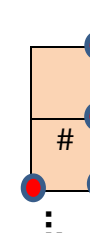
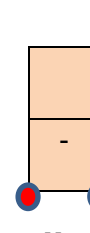
									
									
									
									
									
									

English texts are written using reversed geometric letters (Taham) from left to right.

[Return](#)

Lesson 16- Matching { brAy} Codes with {brAy} Letters

Lesson 17- Matching {brAy} Codes with Reversed {brAy} Letters {brAym}

reversed Arabic texts are written using {brAy} letters {brAym} from right to left.

[Return](#)