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# Color and Light in Architecture and its Effects on Spirits of Space Users in a Psychological View

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#### **Abstract**

Light and its effects considered as a complex issue, since the effects happens during the time i.e. space users reside in the spaces for a long time and exposed to different radiated energies of color and regular radiation of the colors make longer effects on sprit of space users and it has longer durability. In current world situation, in which psychological and spiritual problems arise in different layers of society, most of the problems are the result of the environmental effects, and this is the environment, causing intellectual deviation of people, home and city considered as environment in which city is composed of mass of homes.

Conditioning relax and pleasant environment provided at homes and individuals in the home live together peacefully, the city and society approach relaxation, however, color and light considered as factors cause relaxation and/or stress, which bear strong and deep effect due to endurance. One shall provide a relax and happy environment through correcting interior decoration and using the light and natural colors as well as their effects. In this study, we move toward an environment in which at first color and lighting composed of organic/natural components, colors and lights directed toward natural colors, second, lighting and color of public places shall increase social communications and we prioritize using colors leading spiritual and psychological relaxation. Meanwhile, we shall remind appropriate use of artificial lights, since most of people are not aware of artificial light's side-effect, neither know their disadvantageous aspects.

All researchers know that whatever exists in nature is useful and considering man-made things, although there are useful aspect, its considered as an artificial one and its use bears side-effect, since its an artificial and non-natural thing, and all non-natural things bear environmental side-effect, including spiritual and psychological one, etc. One shall consider side-effects of artificial spectrum and lights in current life of human being, and use them with caution.

Keywords: Color; Light; Architecture; Spirit; Psychology

#### Introduction

Human life affected by different environmental and ultraenvironmental factors, impressiveness of human being from the environment considered as one of effective and persistent factors, i.e. architectural environment, the most effects of architectural space through color and light is obvious on human being.

Using light is widespread in urban architecture and design, thus studying their effects on human being and animals is an inevitable issue, which is in the event of environment protection and sustainable architecture, consequently the effects of color and light on human being is studied [1-4].

#### Methodology

Many books, papers and journals used which are published in the field, in an experiment for six months lighting change and rooms color change are studied to investigate their effects on the individuals' communications and spirits.

#### **Finding**

For six months incandescent lamp used instead of fluorescent lamp in personal house and the house lighting decreased to sufficient amount, so that radiated light of the spaces was complaint to proposed standards in while people and things are visible, only incandescent lamp used, finally following table achieved which is the result of six months to study the effects of the way of lighting and adjusting light and its effects on individuals who enter the space (Table 1).

According to table above, maximum hours that people could bear in the space is a colored compound with white wall and yellow

natural light in which individuals had intimate and warm relationship together, and some issues proposed considering family and individual relationships.

Since many years ago light and color in interior architecture and urban design's architecture have been familiarized, the longer coexistence effected space users' spirits and their social communications,

In this sense, research indicate that design and planning for appropriate use of color and light increases efficiency, and provide proper and safe communication between space users, in spite of its crucially, neglected in recent years in residential houses only for economical saving of incandescent lamp costs, which forms family basis and first human society and the most important one forms bigger community i.e. society while they were close to natural and warm spectrum and classified as lights with good quality but macro lamp economically and false pattern for useless and extra indoor lighting with fluorescent lamps and energy-efficient lamps, causes failure in eye sight and skin complications, etc. in addition to not using

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| Month   | Number of people | Exposing to space | Dominant color | Light combination | Space type emotionally |
|---------|------------------|-------------------|----------------|-------------------|------------------------|
| Month 1 | 2                | 3                 | White          | White             | Cold lifeless          |
| Month 2 | 3                | 3                 | Cream          | White             | Almost Warm            |
| Month 3 | 2                | 3                 | Blue           | Yellow            | Warm and relax         |
| Month 4 | 3                | 1                 | Yellow         | White             | Strangulation          |
| Month 5 | 3                | 4                 | White          | Yellow            | Light warm             |
| Month 6 | 3                | 1                 | Red            | Yellow            | Confusion              |

Table 1: Monthly effects of light and color in a space on individuals.

suitable lamps, including lampshades, causing both interior creative architecture and different spiritual space in space users which is useful in efficient consumption, but they will be forgotten gradually while high consumption pattern emerges to our lives.

Another aspect considering color and lighting is culture destruction and removing ancient architecture, including colored glasses and colored doors as well as colorful carpets which have been used significantly in houses in the past, and affected the residents' spirits positively while they were obvious.

Unfortunately, during past years, particularly interior architecture such as color and light, their long-term deep effects on spirit of space users will be forgotten. While neglecting the fact that color and light's life will remain in our minds for a long time, and such durability during time pass affects spirits significantly, and they are effective on space characteristics, spirits and user communications with together, thus one shall consider color seriously and control its effects practically and psychologically, since its approved that color has particular effects on human life, and the research can used in space color and lighting (Figure 1).

## 2-Glass and carpet colorful components in interior ancient architecture

In this research, we study a main problem of modern architecture's life i.e. weak relationship of family members in modern houses and the role of color and light to increase or decrease the problems.

Scientifically, individual complementary colors spectrum are sum of the remaining colors in a colorful aggregation of colors which are not visible, eye is different from ear, since eye can hear different sounds but eye can't recognize colors separated from each other, and reply color components separately, since colors are components of different light spectrum, for better recognition of colors, one can say that color is the result of light wave and light is a particular material of electromagnetic energy, and human eyes can recognize 400-700 mili-microns wavelength only, now, one can specify color place in life cycle by determining wavelength and frequency of colors (Figure 2).

#### 3-Color circle

Light waves are not colored by themselves, since color appeared in human eyes and mind, its not clear that how we recognize the wavelengths, the only thing that we know is that some colors appeared because of qualitative differences in sensitivity to light.

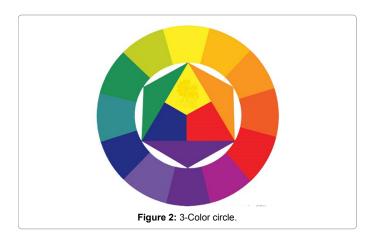
Using lights in space of interior and exterior architecture has a long story. In many cases it is the result of different color components with others causing significant effects on individuals` spirit, today color and light is used for physical and spiritual disorders and reforming the criminals which are proven scientifically and their treatment/reform and their effects have been studied many times [5].

How color and light may have such deep effects? Its worth to mention that light by itself is not such effective, but expresses itself in





Figure 1: 2-Glass and carpet colorful components in interior ancient architecture.



combination with its color, to the other word this is color that has its effects and applications on psychological and architectural field, and the effects are sometimes the effects are immediate and sometimes in future [6].

According to the research accomplished by psychologists, in many cases the effects originated from color are future based and during the time, with less intermediate effects. When an architectural space is designed and accomplished, its color combinations appear during the years and will affect behavioral and attitudinal system and human life of the environment Considering interior design, thing's color and environment should be considered significantly. i.e. if one puts red glass and green glass together in front of an electrical light, its seen in black and dark, since red glass bears all spectrum radiation except red range and green glass bears all lights except green one, consequently no color remains and the result is a black color as well as other colors gained through attraction called subtractive colors.

Things` color has subtractive feature, a red container seems red due to attraction of red lights while reflecting red color, and eye with mind gain particular recognition through contrast and see the thing in particular color, however, considering color combination darkness and brightness degree of a chromatic color can be measured by gray, white and/or using one/more achromatic [7,8].

Color recognition is a psychological-physiological fact different

from physical-chemical feature. Physiologist, O Elderhing, argues that when watching moderate/neutral gray in which there is an equal observing material due to observing and re-production as a result observing material is fixed, to the other word moderate gray creates a completely balanced status in the eyes.

Rick indicated that eye and mind require moderate/neutral gray which is unrest if it lacks. One can utilize color features to know human mind and its recognition by color and it1s effects.

For example, color Foam is first color-related feature that humans recognize easily and recognize it easier than the other aspects, color Foam is a color-feature which is classified as visible colors between different wavelengths [9].

To the other word, red, green, blue are foams which are reported in a particular color, its said that human eyes can recognize 150 different foams, but this time all is distributed in a visible spectrum since our eyes have more ability in a linger waves. There are three aspects that cause our eyes recognize colors: light source, thing, and receiver eye, in fact the factors create a visual message in the mind and finally things' color and environment appears by mind process.

#### **Subtractive Color**

For color recognition and its psychological effects on human being, one shall study the colors one by one, since nature of colors overshadows the environment and spaces and leaves deep effect on human moods through radiation endurance in the environment, as one can say that.

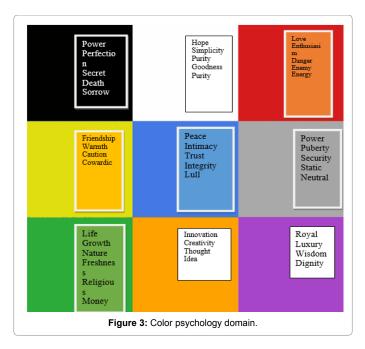
Nature of indicator color is analyzable and recognizable that involves human eye and mind physically and chemically, in this way, colors will be meaningful, any color has particular psychological characteristics for human being, to the other word, they have particular psychological and spiritual effect on human mind and environment, color recognition is a psychological-physiological fact causing particular chemical and physical effect.

Such features in colors changes mind temperature of observer, for example exposing to green, blue, purple and other types in this spectrum, a cool and cheer feeling happens in an observer, in contrast, exposing to colors such as yellow, orange, red transfers warmness and heat to observer and provides activity and stimulation.

Cold colors creates active lull, isolation, and warm colors have stimulator and activity and happiness, for example, blue color is symbol of gratification form relaxation status and enjoying it, soft, light blue with hopeful status, so that human being is placed in affected by supernatural powers. However, green color becomes yellow while keeping moderate characteristics, and moves deeper by adding blue, green is accompanied with science and faith effects.

Purple is a mix of blue and red, a common feature from both of them, this is a luxurious and ceremonial one. A dark mix is energetic and luxurious and lighter and softer spectrum, purple is a mysterious color and considered as creativity symbol, the color considered as cold red both physically and spiritually. Following table is an example of highly used colors and their effects presented psychologically which is the result of experiments and researches in color psychology domain and their effects on human being in a long term and colors concept are visible in the table (Figure 3).

Now the colors and their deep effects indicate meaningful and identity of colors, however, representing color's significant effect



on human environment, since people spent most of their time there which the result of designers and architectures and colors and lights as well as different volumes in the environment is a definite issue and its effects are inevitable through the time over. According to academic scientists and researchers, human being as a phenomenon, is an active biological phenomenon composed of different spiritual, physical and psychological moods who divides the environment into two parts: interior and exterior. Exterior one includes natural and social ones. Obvious example of social environment is a city whose application considered as a suitable context to response biological, spiritual, psychological and citizen needs and a place to change negative emotions to positive and creative behaviors, as a result urban planning, design and architecture requires exact information from human needs and supplying through different light, color, audio and visual methods. Since the effect of environment on human spirit in undeniable, a warm environment with controlled lights and color contrast facilitates space experience and play a key role in emotional relations reinforcement, light and color considered as the most significant elements that reinforce emotional feelings and rough feelings. However, their effects on space are sometimes as private and personalized issues which are different individually. Consequently, people have different reactions in exposing to colors, in this way color selection is an element in urban architecture and design, including building body to design and decoration, meanwhile there are definite patterns for color utilization.

Environmental psychological science studies actions' relationships and mankind relations with interior and exterior environment, mutual effects of human and environment is studied, since human being change goals and values of the environment according to their needs and affected by changed environment mutually.

In particular, technology facilitates human effects on the environment, and increasing effectiveness speed of environment on human being and the effects stability, which is negative in most cases and causing different problems.

Colors not only affect human activities, but also affecting description of a place status, psychologically, light colors show things and surroundings greater. In contrary, dark colors show things and

surroundings smaller, colors change architecture and may cause expansion, widening, expansion, prolongation, and causes a false recognition of ceiling. Color effects are so effective on mankind that dark things look heavier, while bright colors shows things lighter, for example, psychological effect of color is clear in following example:

Workers of a company complained about carrying metal boxes since they look heavier and difficult, while weight 5 kg only, experts suggested that change the box color green, then no complain heard from them while there was no change in their weight.

Now, we can explain the color recognition in more applied way, for example blue color indicates sweet taste i.e. known as sugar packing color. However, this color causes dumb for hearer.

According to the research, blue color known as teachers and trainers, if walls behind the students painted blue, in these way teachers have more chance to manage the class, however contact capacity with blue color is 2 hours for a teacher and it will cause disconnection if it is longer.

Red is a powerful color strengthening the heartbeat, increases blood pressure and causes respiratory acts, consequently extra use of red color in urban spaces may be chaotic. In some cities, red used as simulator furniture to attract tourists. Study of color provides in physical and physiological field. Color effects on spiritual and psychological quality on human life are beyond the imagination. Only one part of them reflected in spirits, work, fatigue, incidents, family member relationships, art and human recognition. Even though color associates with mankind past, consequently causes positive and negative effects.

Natural light is very effective in visual relaxation when watching colors. Research indicate that colors have different effects on both human spirit and soul, and their bode as well Colors play key role in professional life, and it may be used as a tool to send a message to others, its suggested that dark blue/gray dress used in official environment to appear as a successful, knowledgeable person, meanwhile simple, white shirt providing respect and formality. As mentioned earlier, different colors used for different goals in particular environments. Proper use of colors requires its recognition; a main issue in color application is color harmony i.e. a conditioning sorting of components of a general and its existing in all aspects of life.

Considering visual aspect harmony is something that provides eye enjoyment, the harmony attracts the beholder and causes discipline and balance feeling, while if there is an non-harmonic thing mental fatigue caused in human being and viewer, in one hand extra harmony turns into a moderate complex and boring and fails to attract the viewer so much.

Human mind rejects whatever is not organized, view requires a rational structure and color harmony fail to provide the interesting in view and sense of excellence.

Complementary colors have interior harmony, complementary colors are those that located in front of each other in color circle, and enough contrast shall be provided when using the colors.

There are many harmonies including Isosceles, rectangle and square harmony, another way is using color contrast of which the simplest one is color tint contrast that is obtained through putting the colors together, the well-known contrast yellow and red, blue and red, blue and green, pure colors shall be used to obtain the colors.

Pure colors don't mean main colors merely, but all colors in color circle may be used as pure color. The most sever contrast is tint red, yellow and blue of which there is no common feature by being colored. Another way is using the dark and light contrast emerging through putting up light and dark colors. The contrast may be a single color compound, the effects of light and dark contrast on color relationships and a work's contacts has particular effect after tint effect.

Another method is expressing cold and warm contrast. The contrast emerges when cold and warm colors are put together, typically color circle's colors from yellow to purple considered as warm colors and purple to yellow and cold green considered as cold ones, generally warmness and coldness feeling toward colors is related to our recognition and experience from natural elements of nature.

However, there is no boundary for colors coldness and warmness but their cold and warmness depends on adjacent color and inner feeling of the contacts.

Another way is synchronic contrast; the contrast happens when two colors contrasted to each other, so that delusion of shake and/or shadow emerges, synchronic contrast originates from general effects of the colors on visual sense. When we see a color, our mind and eyes create the complementary color which is known as synchronic contrast, however color emerges mentally and its not concrete, but its just felt. If there is a neutral gray in a strong square background with same shine, the gray appears in the eyes so that bears the background color, synchronic contrast may happen between two different colors which are not complementary.

#### **Quantitative Color Contrast**

Considering extension, contrast is quantity of mutual relationship of two or more colored surface, surface conflict and/or color quantity presenting utilized colors in a work, i.e. considering quantities of colors contrast to each other, and paying attention to colored surface in a work are as significant as the color by itself, any colored compound should be based on surface elements ratio to each other.

Coloring refers colors' sorting and compound in a work, the concept refers the way that the colors approaching and harmony and beauty in different compound colored moods.

Instruction coloring refers colors compounds that formed during the time to put together the colors tunable, either contrast or related ones, and particular coloring creates different senses in mind. For example, using green and red colors together rebuilding difficult decision, sconce red means s and green means resuming a task.

### **Color Stability**

General tendency of thing color for being stable in different light changes, including intensity, and source color known as color stability, the phenomenon is closely related to metamaryzm even in some cases the relationship is confusing.

Research indicated that pair of metamaryzm from two materials is formed from different stability, so that by changing the light source, a sample with less color stability faces more color change, thus causing color contrast under second light source.

Generally things in nature including natural colors in animals, plants, minerals etc. bear great stability than artificial ones may originate from psychological reasons and/or their reflexive features.

#### Color and Life

Generally color affects on feelings, physical status, psychological moods and even daily conversations i.e. color of space users' environment make them think about warm feelings and vice versa cold and depression and impatient feeling.

Color and environment lighting bear spiritual effects, so that the load and energy affecting space users decisions significantly.

Physiological investigation proved that colors can create physical and instable responses such as raising/lowering blood pressure, heart beat, sweating, respiratory system and even brain waves patterns.

However, academic research detected a direct relationship known as "Psychoneuroimmunology" ¹ and indicate that "Nerve Fiber Network" and "Thing Molecule Paul" and spirit connected to each other, and feelings, emotions, permeate body cell organism.

Now a good, positive mood can reinforce while negative moods can weaken the system, one can see direct, stable effects of the color in human life, that how it interferences spiritual and physical health, While human being does not feel or observe it directly, color psychologists can help us in this regard Everyone knows about color psychology less or more for example colors such as blue, green are more relaxing, red and orange considered as simulator, attractive, exciter, and some research show that red raises blood pressure and increase breathing and heartbeat, It seems that, according to research, the physiological effects of colors are less or more same for all human being below values show color attraction for some cases:

Orange: 2/21, red: 6/18, blue: 5/17, black: 4/13, green: 6/12, yellow: 2/12, purple: 5/5.

Although, considering physical aspect, the effect of colors are almost same on human being, only few colors considered as significant and holy ones proportional to the land's environmental and cultural conditions.

Applications and conceptual layers of color in architecture:

Current colors in architecture spaces may be selected for some reasons, simplest one is natural color of building materials considered in the past and interior architectural spaces and landscapes designed with same natural.

#### Colors

For example brick and originated color, building stones and other materials such as plaster and white color, color in architecture, in the simplest way, may reflect natural lateralize i.e. its considered as natural environmental sign, most colors in particular in interior designing considered due to aesthetic and harmonic compounds.

However, today color effects and energy are not considered when using and compounding them together, using white color and other colored compounds considered only for aesthetic aspects, and various happy colors are used efficiently in carpet, ground cloth, curtains and other furniture.

Selecting different colors was common in simple interior designing and utilized to indicate the nation/king`s power and greatness. Correct use of color in building is so crucial that we shall study the culture and color concepts before coloring plan i.e. considering conceptual/applied aspects of colors in architecture spaces, one shall consider historical era, and place of the building construction.

¹PNI

Since a color may be considered as ritual and symbolic one, while its considered as pleasurable in another culture, for example red considered as ritual and symbolic in a nation and vitality and succulent in another one.

Concept and application of architectural color depends on historical time era, so that Turquoise and blue color were used in mosques until Saljoghian era in Iran, but conceptualized as cultural-ritual concept, colors in architecture reflecting concepts and different factors including natural environment of cultural/social and aesthetic, to the other word, many colors are proportional and the result of space users indoctrination but one can't neglect its effects.

Now we see that what does color therapy mean and how does it work?

Art and/or color therapy science is an old science, professors, scientists in past recognized the art and once again the art appears in new era.

In the past in Greece and Egypt color used for curing, Indians and Chinese were aware of color cure, and they had temples instead of hospital where patients were hospitalized there and got particular spiritual and physical energy using arts.

Colors are not remedial only, but they break individuals inner barriers and in this way, natural energies may be effective in treatment, now we can review some ancient beliefs discovered in new age and complete them with more knowledge and understanding.

The treatment methods are more effective because as human being we have spirit and we are effected positively and negatively due to color fluctuations in daily life.

However, most of us are not aware from the effect that our effectiveness is different in different color fluctuations for example, watching light red and wearing dress in this color stimulating a feeling while wearing blue dress in a room with blue paint may arise a different reaction.

As a result one can utilize the tools through learning the features and individual color effects, sound and light affect differently on individuals, but the fact is that the more we are aware, the more we will be affected since we understand the concept and meaning and enjoying the effectiveness.

Colors may be regarded as instrumental interface, when we recognize someone's color we can achieve his/her feelings through the means and related energies and we can build an appropriate relationship with him/her. Considering therapy work, when we recognize patient's color, he/she see that we noticed his/her feelings then a real relationship starts between the patient and therapist.

Colors have effects beyond the visual reactions and responses, suppose that you are in a room with happy colors and furniture with closed eyes, then suppose that you are in a room with brown walls and stuff, now regardless the fact that your eyes are closed, if there is a difference between two rooms?

Yes, because colors, similar to other things in the world, create vibrations and they are received through different ways, we feel our body organs, we see, hear and many skin cells can get most of acoustics and visual vibration without using eyes and ears.

We shall learn the application of color-originated energies in spiritual, physical and emotional health, its significant to evaluate

person who will be treated via color, individuals have particular characteristics, consequently as individuals have different needs, their reaction are different from each other, as a result, considering color therapy, we shall first analyze the problems then use appropriate means for individuals.

Everyone has a basic and main color, consequently when treating with colors, we shall first know his/her basic color, the color provides a general idea about his life route as well as his/her strengths and weakness.

Considering his way of life and particular problem of patient, we can assign and use appropriate color for individual's treatment. One way to find life way is using muscle test.

Now take a seat and hang your powerful hand, however you can do this test on foot.

In this mood, take a color sample on your weak hand, now your assistant shall pull the hanged hand down and first one resists, if he show good resistance in front of second one, its known that, first one has good resistance to the color and vice versa if he can't resistance in pulling his hand, representing negative reaction and it indicates that this is not an appropriate color to him. Practice this test with different colors, the higher resistance indicates that its his basic color. Color imagination is another tool to get color energy, since imagination ability increases creativity.

Try to use colored bubbles around you. We create the color's energy when thinking and imagination about a color, generally we produce whatever we think, we can do this for others through imagination, when we concentrate on a particular color, we create the color's energy on it and preserve it. Created energy indirectly affect our speech and decisions and changes our thought way and making decision light and color in new era architecture seems very useful, but the fact is that its not useful but modern architecture affected by color and light turbulence, so that many cities emerged in day and it1s difficult to differentiate day from night.

It causes light and color pollutions and neglecting lighting the streets and alleys, lack of appropriate coloring of urban space, increasing problems' intensity and speed such a incorrect color and light compounds is obvious in house spaces.

So that we face extra light radiation and we use extra lighting, there is no contrast of colors and lights, but the most spectrum of houses belongs to radiated lights from fluorescent lamps and low-pressure sodium lamp.

Bearing cold light, this kind of spectrum causes spiritual problems due to lack of compounding with appropriate colors. For example, one can say that in distant past in rural houses a natural color compound existed as moderate harmony and rarely using conflict colors in nature causes spiritual relaxation and positive effects, soft natural lights including fat-burning and oil lights were used bearing natural spectrum close sun light, did not cause eye daze, meanwhile their light had warm natural light cause intimacy and sympathy.

#### Conclusion

Light and color effects on human life changed into an inevitable

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fact affecting all human life aspects, one can say that color effects is deep and supernatural, since spaces where people live have different light and colors, due to endurable the light and color's effects are deep.

This is a crucial and significant issue that color and light are effective in our social behavior, first we shall approach toward the way that space and light compounds and their lighting get use of organic compounds and/or natural light, and lights and colors directed toward natural lighted, second, it causes social connections and we prioritize using colors that causing spiritual relaxation. We shall remind proper use of artificial lights, since most of people are not aware of side effects of artificial lights and they did not recognize harmful aspects of them. We know that whatever exists in nature is useful and whatever is made by human being considered as artificial one bears side effects since its artificial and non-natural, thus one shall consider spectrums and artificial lights in modern life and utilize them with caution.

In current statue of the world, in which there are many psychological and spiritual problems in different social layers, most of them originated from environmental effects and this is the environment that causes different intellectual deviation, one of them is house and city.

However, city is composed of different houses, while house considered as relax and pleasure environment and house members are kind to each other and live peacefully. Society and city approach relaxation, one of factors causing stress and/or relaxation is color and light, which has strong deep effect due to endurance.

Thus, one shall provide happy and relax environment by correcting interior design and using lights and color seriously. Light and color is an extended issue in which it can do many works.

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