



وزارة التخطيط
وتكنولوجيا المعلومات



Collected By: Mazen AboBakr

Udacity copyright all right reserved ©

Week 17 – Week 20 (Digital art and circuits)

Graphic design: is a type of visual communication that uses graphics, text, illustrations, and symbols to convey ideas and emotions. include logos, book covers, magazine layouts, billboards, posters, and many others.

Digital design: is a type of visual communication that provides information through a digital interface. it also uses images and visual elements to communicate ideas & emotions, but is designed specifically for digital screens (used in app desings , webpage design , social media , video games , UX Design (User Experience)).

! One of the main differentiating factors between **graphic design** and **digital design** is 'motion' or 'movement'. Graphic design is mostly static (logos, magazines layouts, posters etc.), while **digital design** involves movement (animations, interactive elements).

Brand Identity (الهوية): the visible elements of a brand, such as color, design, and logo that identify and distinguish the brand in consumers' minds.

Marketing: the use of visual elements to convey a message or promote a product/service.

Product Packaging Design (تصميم تغليف المنتج): unique product packaging designs to reflect the brand's identity, attract customers, and also provide product information.

composition (التكوين): is a group of design elements arranged in a certain way to express a meaning, message, or feeling. These elements are the basic building blocks of any type of visual creation, including visual art and design. elements of composition include:

- ✦ **Lines:** form the most fundamental element of design. They are not always straight and can take a variety of forms like curved, zig-zag, diagonal and so on. Lines help define or organize information.
- ✦ **Shapes:** any enclosed space defined by lines that stands out from its surroundings. Shapes can be geometric shapes (squares, ellipses, triangles, etc) or organic (leaves, rocks, tree branches etc).
- ✦ **Color:** helps to give emphasis to specific areas or establish the mood of the composition.
- ✦ **Typography:** Typography refers to the shape, style, size and alignment of the letters in a design.
- ✦ **Photography:** Photography can bring elements of the real world into a design.

- ✦ **Space:** positive and negative. The positive space is the area that is the subject or the area of interest in a design. Negative space is the white space or empty space which is the background or the area surrounding the subject of the design.

Principles of design (مبادئ التصميم): are a set of rules or guidelines that designers can follow when creating a composition. include :

- ✦ **Scale:** The size of elements in a composition in relation to one another.
- ✦ **Repetition (التكرار):** Multiple appearances of an element in a composition, often forming a pattern.
- ✦ **Contrast (التباين):** The difference between elements in a composition which can be used to separate elements, create visual hierarchy, and create emphasis in certain aspects of a composition.
- ✦ **Alignment (النسق - المجازاة):** The way elements are arranged in a line. (*The 3 main types of alignment are center-aligned, left-aligned, and right-aligned.*)
- ✦ **Rhythm (إيقاع):** The feeling of movement created by the way elements are placed in relation to each other.
- ✦ **Unity (وحدة ما بين العناصر):** When several elements purposefully have similar characteristics, establishing a tie or relationship between them.
- ✦ **Balance (التوازن):** placing elements in certain areas of your composition to create visual harmony (الانسجام البصري).
- ✦ **Emphasis (توكيد):** Making a certain element stand out from the other elements in a composition (can be emphasized by contrasts in scale, color, space, or typography).

1- When overlaying text on an image, ensure there is a *significant contrast between the text and the image.*

2- When placing a text close to an image, *align it to the image's left, right, or center.*

3- When working with a paragraph of text and an image, you can place the paragraph above, below or beside the image. You can also wrap the text around the image.

Design hierarchy (التسلسل الهرمي للتصميم): refers to the importance of elements in a design. It determines how our eye moves across a design. *Our eyes will view the most emphasized element in the design first.* it can be created using contrast in scale, typography, color, and so on.

Golden ratio: is a *mathematical principle, and it applies to anything with the ratio of 1 : 1.618.*

- ✦ The golden ratio can also be seen in the **Fibonacci sequence.**
- ✦ **Fibonacci sequence (تسلسل فيبوناتشي)** is a series of numbers where each number is the sum of the two preceding numbers. For example, 0, 1(0 + 1 = 1), 1, 2(1 + 2 = 3), 3, 5(3+5=8), 8, 13, 21(13 + 21 = 34), 34 and so on. As the numbers in sequence get larger, the ratio between them gets closer to 1:1.618 which is the golden ratio number.
- ✦ When you turn the sequence into squares and lay them side-by-side to create rectangles, a spiral is formed which is known as the golden spiral.
- ✦ its uses :
- ✦ --Logo designs
- ✦ --Website layouts
- ✦ --Typography
- ✦ --Image compositions

Animation: is a method by which still figures are manipulated to appear as moving images.

Motion Graphics, which falls under the umbrella term 'Animation', usually features shapes, objects or text that are being set in motion.

Flipbook(دفتر الصور المتحركة): is a series of images that change slightly from one page to the next. Viewing the pages quickly creates a sense of motion. This same principle of "frame by frame" animation applies in all forms of *digital animations* created using various computer programs.

Extended Reality(XR)(الواقع الممتد): is the umbrella term for all environments made by computer technology . Some of the immersive experiences that fall under XR include:

- ✦ **Virtual Reality(VR)**(الواقع الافتراضي): An invented three-dimensional environment that you can interact with in a way that seems completely real. VR content can be a 360-degree, real-world video, or something that's entirely computer generated, or a combination of both.
- ✦ **Augmented Reality (AR)**(الواقع المعزز): An interactive experience that displays computer-generated visual, auditory, or other sensory content over a real-world environment.
- ✦ **Mixed Reality(MR)**(الواقع المختلط): Mixed Reality combines the real world and the digital elements. In MR, you can interact with both virtual and real objects

creative process: refers to the steps taken by designers to get a design to move from ideation, to finished product. We can break the process into four major steps:

1- **Ideation**(مرحلة التفكير): Ideation is the act of collecting thoughts, inspirations & IDEAS that might be useful in your artwork or design. The ideation stage may include referring to a creative brief. A **creative brief**(موجز ابداعي) is a document that gives all the important information about the project and the creative deliverables. The ideation phase also includes all the necessary research to understand the project better and also find inspirations.

2- **Development**(مرحلة التطوير): Development phase involves fleshing out(ينظوي علي تجسيد) the concepts that you came up with during *ideation step* and bringing those ideas to life by creating the actual design.

3- **Reflection**(مرحلة الانعكاس): Reflection is the act of looking at your design thoughtfully to know if the design meets all its objectives or not. (*This also includes gathering feedback on your design from the stakeholders.*)

4- **Finalization**(مرحلة وضع المصنفه النهائيه): Finalization is the step to release the design to the public or the client, once it is finished and approved, in the appropriate formats:

- ✦ **Digital** (social media or websites): **JPEG** and **PNG** (*Saving a picture with PNG format if you want a transparent part*)
- ✦ **Print**: High resolution **PDF**

Creative block: can be simply defined as the inability(عدم القدره) to come up with any new creative ideas, find inspirations or move forward in the creative process.

Tips for overcoming a creative block:

- Keep a sketchbook
- Words in a jar
- Follow other artists on social media

Mood board: is a type of *one-page presentation* or 'collage' consisting of images, text, and color samples, which convey the general idea, style or design direction of any project :

- A mood board is a tool to visually organize all the ideas that designers have for a particular project, and establish the look and feel of the the end design.

- A mood board provides the creative freedom (الحرية الإبداعية) to experiment with ideas and inspiration at the *ideation phase* of the *creative process*.
- A mood board is also a helpful communication tool to give clients a sense of the style that the designer is going for.
- A mood boards also helps in collaboration between team members by making it easier to communicate ideas and concepts through visuals.

Types of stock images:

- 1- **Public Domain** (ملكه عامه): the image is free to use without purchasing a license, and can be used for commercial or personal purposes.
- 2- **Royalty-Free** (بدون حقوق ملكيه مقابل الدفع لمرره واحده): the image can be used without many restrictions based on one-time payment to the licensor.
- 3- **Rights-Managed** (الحقوق المداره او الاستخدام لمرره واحده): one-time use of the image as specified by the purchased license.

Creative Commons is an organization that provides access to educational material and expands the kinds of work creators can use.

- ✦ A creative commons license is a license issued by the copyright owner to allow anyone in the world to use their copyright work in any manner consistent with that license. There are multiple types of Creative Commons licenses - some may require you to credit the author, while others may let you use the image without crediting.

There are 2 types of graphics that are designed using computers:

1- Pixel Graphics

- Pixel graphics are made up of little squares called the pixels, which can be seen when you zoom in on your image. Pixel is the smallest unit of a digital image. The word pixel is a combination of 'pix' (from "pictures", shortened to "pics") and 'el' (for "element"). The quality of these images is based on the resolution of the image. How much you can magnify these images before the pixels start appearing depends on how high their resolution is. The appearance of pixels on zooming in is known as 'pixelation' (Image is made up of small units which can be seen on zooming in.).

2- Vector Graphics

- Vector graphics are images created with mathematical formulas which calculate where the edges of the shapes sit in relation to one another. In vector graphics, the sizes can be easily *scaled up or down without losing quality or getting 'pixelated'*. (Image does not get 'pixelated' no matter how much it is zoomed in.)

Color theory (نظرية اللون) is a set of guidelines for color mixing and selecting balanced & effective color combinations in design.

The color wheel: is at the heart of color theory. It visually shows the relationships between different colors, and is universally used by visual artists and designers to make informed decisions about the colors they choose for their creations. (for information its created in the late 17th century , created by isaac newton) the 3 main parts on the color wheel :

- 1- **Primary colors** (الألوان الأساسية): These are the building blocks from which all other colors are derived (مستمد). The primary colors are red, yellow, and blue.
- 2- **Secondary colors** (الألوان الثانوية): These are color combinations created by the equal mixture of two primary colors. The secondary colors are orange, green, and purple.

3- Tertiary colors (ألوان ثلاثية): These are the combinations of primary and secondary colors. On the color wheel these colors *exist between the primary and secondary colors*.

The 3 main color relationships or combinations on the color wheel are **complementary**, **analogous**, and **triadic colors**.

1- **Complementary colors (الألوان التكميلية)** are colors that sit directly across from each other on the color wheel.

2- **Analogous colors (الالوان المثاليه)** are groups of 3 colors that are next to each other on the color wheel.

3- **Triadic colors (الالوان الثلاثيه)** are 3 colors spaced equally apart on the color wheel, forming a **triangular shape**. The components of color are **hue**, **saturation**, and **value** :

1- **Hue** answers the question “**What color is this?**” and is determined by the dominant wavelength of the visible spectrum. *Hue is identified by the name of the color, such as red, orange, green and so on.*

2- **Saturation** refers to the **strength or intensity of a color**. It refers to **how much white is mixed with the hue**. The more saturated a color is, the more vivid or brighter it appears. Desaturated colors, on the other hand, appear duller.

3- **Value** refers to the **lightness or darkness a color**. To make a color **darker**, add *black*, and to make it **lighter**, *take away some of the black*. **Bright**,

saturated colors feel excited and happy.

Less-saturated colors feel peaceful, calm, and relaxing.

Warm colors often express more intense emotions, (like love, anger, joy, and danger.)

Cool colors often express less intense emotions, (like boredom, peace, relaxation, and sadness).

Individual colors can evoke specific emotions or feelings. (*This idea is used by many brands while choosing the colors associated with their logos and overall brand identity.*)

Color palette: is the **group or range of colors that one intends to use for a particular design project**. Designers use color palettes to create a visual hierarchy, define emotions, and create a unified and consistent look and feel.

examples of color palettes:

1- **Triadic:** Color palettes **made from three colors at equidistant points on the color wheel**. *For instance, red, yellow, and blue.*

2- **Monochromatic (احادي اللون):** Color palettes **made from different shades of the same color**. *You can create the shades digitally when you change the value of the color.*

3- **Palettes inspired by nature (لوحات مستوحاة من الطبيعة):** Color palettes **made from things you see in nature instead of the color wheel and the color combinations**. *For example, a palette can be inspired by the shades seen in a summer landscape.*

4- **Palette created from an image (لوحة تم إنشاؤها من صورة):** Color palettes **made from the colors present in an image that is to be used in a design**.

Typography (الطباعة): is the art and **technique of arranging letters and words in a way that makes them clearly legible, visible, and appealing when displayed**. It is one of the key elements of composition in graphic and digital design. Typography is often referred to as text, and the many different styles of text are called fonts. There are 4 main categories of fonts in graphic and digital design:

1- **Serif fonts** are the **traditional type of font**. They mimic the way letters were written when typography first became widespread. A “**serif**” is a **small line or stroke at the edge of a letter**. Serifs are also referred to as the “**foot**” of a letter. (These kinds of fonts are typically used in more traditional situations, such as official documents, newspapers, and literature. They may also be used by more traditional brands and websites.)

2- **Sans serif**(without serif): fonts don't contain a serif or the stroke at the end of a letter. The term "sans serif" means "without a serif" in French. Sans Serif fonts are more modern than serif fonts, and are the most commonly used type of font in the digital world.

3- **Script fonts**: appear to be written in cursive. They generally work better as headings than as body text, since they are not as easy to read as serif or sans serif fonts. They're also more decorative than serif and sans serif fonts, and can give your design a luxurious, soft look.

4- **Display fonts** are much more funky and unique than the others. They have a **decorative quality**. Display fonts should be used sparingly to avoid any issues with readability. Like script fonts, they're best for headings or titles. They are also great to use when text is the focal point of your design.

Intro to Circuits

Electronic means having to do with electrons.

Circuit is simply a path that allows electrons to flow through it ,a closed (unbroken) path through which charges can flow.

Conductor(موصل): Any material that allows charges to flow.

Current: The flow of charges through a circuit. Measured as the number of charges flowing through a given location per **second**.

Electron: A subatomic particle(جسيم دون ذري) that has a **negative (-1)** charge.

Proton: A subatomic particle that has a **positive (+1)** charge.

Electrical force(القوة الكهربائية): A force that acts between charged bodies. **Opposite charges attract** , **like charges repel**.

Electrical energy(الطاقة الكهربائية): Energy that we get from the movement of **charged** bodies.

Insulator(عازل كهربائي): Any material (such as **plastic**) through which it is **difficult** for charges to flow.

Voltage tells us the **amount of potential energy per charge**. (1)

Power the amount of energy the circuit can transfer per second. Power is measured in **watts**. (2)

From (1) and (2) we conclude that (**Current x Voltage = Power**)

Resistor(المقاوم): is simply a component that **resists** (and thus reduces) **the current in a circuit**.

Switch is simply a **component that can open and close a circuit**.

Mechanical switches they are **switches that we physically move**.

Transistor is a **current-controlled switch** (as well as an **amplifier**)

-- **Collector, base, and emitter**: These are the **three terminals of a transistor**. In the most common type, **the transistor is "switched on" by applying a small current across the base and emitter**.

Series connection the components are **placed one after the next in a single electrical path**. There is **only one way for the current to travel**.

A few key properties of series connections are:

- The current is the same for all the components.
- If current stops flowing through one component, it breaks the whole circuit.
- Series connections allow us to create "**AND**" relationships (e.g., where a light is on if one switch and a second switch are both closed).

Parallel connections, there are **multiple electrical paths** (multiple ways the current can travel through the circuit).

A few key properties of parallel connections are:

- ✚ **-Current can be different at different locations.**
- It's possible for current to stop flowing in one part but continue flowing in another part.**
- Parallel connections allow us to create "OR" relationships** (e.g., *where a light is on if one switch or another is closed*). *simply means having to do with electrons*).

Udacity DECI TERM2 CONTENT

Collected By: Mazen AboBakr



Mazen AboBakr