

This module is used for sound notification in systems, for the operation of which in the desired sound signal.

Piezoelectric speakers are widely used in various household appliances and toys that use electronic boards. It converts commands based on the binary number system 1 and 0 into sound signals.

The assembled circuit with the Piezoelectric speaker is shown in Figure 4.

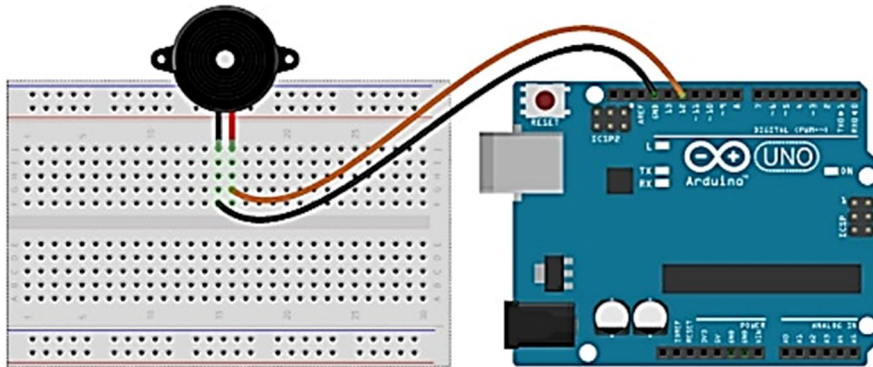


Figure 4 – Assembled circuit with the piezoelectric speaker

Thus, the Raspberry Pi microcomputer is a good device for both studying and implementing more complex projects due to its multifunctionality.

## **NATURE INTEGRATED ARCHITECTURE: THE ORIGIN AND PERSPECTIVES**

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People and nature have been interconnected since the very beginning of the human kind. Climate and weather, wild animals and plants affected all their activities, and though at first people were fully depended on their environment regarding all natural forces as gods and spirits they needed to worship, human civilization gradually tried to conquer the nature and adjust it to their demands.

As time passed, people learned to use natural resources and obtained the knowledge on how to tame the dangerous side of their habitat. However, this power was only an illusion, and nowadays we are getting more and more consequences of our intrusion. Intensive changes brought to the nature created ecological discomfort, so more and more scientists of different branches turn their attention to principles of eco-friendliness.

Nature integrated architecture is not a particular style of architecture, but rather a form of ethical relationships between people and nature expressed in the form of engineering and design. This term was firstly used by Frederick Law

Olmsted, a landscape designer who created Central Park in New York in 1859. Despite this fact, some ancient civilization had created examples of nature integrated architecture long before the concept was introduced. One of the most famous examples is the Hanging Gardens of Babylon which looked like a giant green hill. Trees in this construction were situated on the stairs of a high tower. A layer of soil on each step enabled to create a lush garden of local and foreign plants looking like a miracle for ancient people considering dry climate in Babylon.

An important milestone in the development of nature integrated architecture can be considered the appearance of “organic architecture” concept created by Louis Sullivan. Its aim is to integrate a building into its natural environment by using materials typical for local areas so that it merges with it. The design and form of a building should not only reflect its function, but also match the nature around it.

Modern concepts of this type of architecture are based upon the principle of compensating the damage caused to the nature by constructing the building. It means that people create “the second nature” as an equivalent to the lost one. There are lots of technics that can be used for it: vertical garden facades, green rooftops, underground architecture, inside (also called winter) gardens, dematerializing the building with the help of a mirror façade etc. Nevertheless, we should not confuse nature integrated designs with so-called “green” building, as it influences not the environment itself, but people living in it. It mixes natural elements with the constructions to make the area comfortable for its residents by making the air fresher and the landscape pleasant to look at.

There exist some prominent examples of nature integrated architecture in the world. Campus Sergio in Greece is considered to be a part of the landscape because of its green roof. On the top of Commerzbank skyscraper in Frankfurt a whole complex of ten spiral gardens is placed, each of them is dedicated to a different theme. An artificial canyon in Namba Park, Osaka, is covered with plants growing on terraces and balconies, so this makes the air around cooler and helps to save the space needed for houses in the area. Another example of this approach to building is Agora Tower in Taipei which is called “green DNA” due to its unusual twisted shape; it is made of eco-friendly materials, has solar panels installed on the top and lots of trees on its balconies.

Speaking about Ukraine, our school of architecture still needs time to adjust to the new tendency, and so we do not have any famous examples of it.

Nature integrated architecture is not just another style of building; it has established new ethics in relationship between people and nature showing their interconnection and mutual dependency.

#### **References:**

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2. Luis D. Garrido. Self-Sufficient Green Architecture, 2012. – P. 96.