

Gilbert Labelle

Gilbert Labelle is Professor of Mathematics at the Université du Québec à Montréal. He was born in 1944 (June 8) in the town of Longueuil, south of Montréal. His 3 brothers, Denis, Jacques, and André, are also mathematicians. Their parents, Lucien and Yvette, were artists.

Gilbert, what do you like about math?

I like mathematics because it is beautiful, full of surprises, gives me complete freedom of thought and, at the same time, it can be applied efficiently to solve problems in science and society.

When you were young, did you like math the best?

In fact, when I was very young, I liked every subject, from art to sciences.

How are art and mathematics similar or different?

They are similar in that they both use human imagination and skill to combine things to create new things. However, in mathematics, everybody agrees in the way things are combined while, in art, things are combined according to individual feelings. Of course, this does not prevent mathematicians from having individual feelings and artists from having universal conventions.

What does a mathematician do?

Essentially, a mathematician uses his or her imagination to combine ideas, as clearly as possible (using formulas, geometrical figures, computers, etc), to create new ideas and to provide a language and a way of thinking for all Science.

What is your area of research?

My area of research in Mathematics is Combinatorial Analysis. It is essentially a subject of pure mathematics but it is closely related to applied mathematics and Computer Science.

How is Combinatorial Analysis used?

Combinatorial Analysis is useful in organizing and compressing data structures in Computer Science; in defining symmetries of molecules in Chemistry; in analysis of DNA and the classification of species in Biology; and, in many other human



activities, like encoding compact discs, encrypting transactions, and designing flight schedules.

Can you give us a simple problem that involves Combinatorial Analysis?

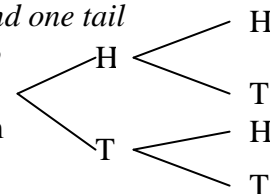
Suppose you tossed a coin twice. What are the possible outcomes? In answering this question you could use Combinatorial Analysis.

If I tossed a coin twice I could get two heads, two tails, or a head and a tail.

True. Which of these combinations do you think is more likely to occur?

Hmm. I think the one head and one tail combination is more likely to occur. Is this correct?

You could use a tree diagram to help you decide.



I see. There are four possible outcomes: HH, HT, TH, and TT. And, two of the outcomes involve a head and a tail.

A diagram like this, which helps represent the various combinations, is called a combinatorial structure. A combinatorial structure can often be thought of as a "skeleton" of a more complicated object (from the real world or from the world of ideas).

Can you give us some other examples of combinatorial structures?

A map connecting towns through roads is a combinatorial structure, which schematically represents real routes connected by real roads. Another example is the output of a computer program (or even the computer program itself!).

SOMETHING TO THINK ABOUT

1. What does Gilbert like about math?
2. What do you like about math?
3. What does a mathematician do?
4. What is a combinatorial structure?