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## A brief history of ethical thought

The moral and ethical theories applying in engineering ethics are derived from Western cultural tradition. These ideas originated in the Middle East and Europe. Western moral thought has not come down to us from just a single source. Rather, it is derived both from the thinking of the ancient Greeks and from ancient religious thinking and writing, starting with Judaism and its foundations.

There was a great deal of influence on ancient religious thought by the Greek philosophers. Greek ethical thought originated with the famous Greek philosophers Socrates and Aristotle, who discussed ethics at great length in his *Nicomachean Ethics*. Greek philosophic ideas were melded together with early Christian and Jewish thought and were spread throughout Europe and the Middle East during the height of the Roman Empire.

Ethical ideas were continually refined during the course of history. Many great thinkers have turned their attention to ethics and morals. For example, philosophers such as Locke, Kant and Mills wrote about moral issues. The thinking of these philosophers is especially important for our study of engineering ethics as that moral principles are universal, regardless of their origin, and are applicable even in secular settings.

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## Ethical theories

In order to develop workable ethical problem solving techniques, we must first look at several theories of ethics in order to have a framework for decision making. There are four ethical theories:

- Utilitarianism
- Duty ethics
- Right ethics
- Virtue ethics

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## Utilitarianism

**Utilitarianism** holds that those actions are good that serve to maximize human wellbeing. The emphasis in utilitarianism is not on maximizing the well-being of the Individual rather on maximizing the wellbeing of the society as a whole. It is called collective approach. For example : building of dam. Dams often lead to great benefit to society by providing stable supplies of drinking water, flood control, and recreational opportunities. However, these benefits often come at the expense of people who live in areas that will be flooded by the dam and are required to find new homes, or lose the use of their land. Utilitarianism tries to balance the needs of society with the needs of the individual, with an emphasis on what will provide the most benefit to the most people.

There are some problems with it. First, as seen in the example of the building of a dam, sometimes what is best for everyone may be bad for a particular individual or a group of individuals. An example of this problem is the **Waste Isolation Pilot Plant** (WIPP) near Carlsbad, New Mexico. WIPP is designed to be a permanent repository for nuclear waste generated in the United States. It consists of a system of tunnels bored into underground salt formations. These salt beds are considered by geologists to be extremely stable, especially to incursion of water which could lead to seepage of the nuclear wastes into ground water. However, there are many who oppose this facility, principally on the grounds that transportation of the wastes across highways has the potential for accidents that might cause health problems for people living near these routes.

An analysis of WIPP using utilitarianism might indicate that the disposal of nuclear wastes is a major problem hindering the implementation of many useful technologies, including medicinal uses of radioisotopes and nuclear generation of electricity. Solution of this waste disposal problem will benefit society by providing improved health care and more plentiful electricity. The slight potential for adverse health effects for individuals living near the transportation routes is far outweighed by the overall benefits to society. So, WIPP should be allowed to open. As this example demonstrates, the utilitarian approach can seem to ignore the needs of individuals, especially if these needs seem relatively insignificant cant.

--Why is utilitarianism wrong

It is impossible to know exactly what the consequences of an action are. It is often impossible to do a complete set of experiments to determine all of the potential outcomes, especially when humans are involved as subjects of the experiments. So, maximizing the benefit to society involves guesswork and the risk that the best guess might be wrong. Despite these objections, utilitarianism is a valuable tool for ethical problem solving, providing one way of looking at engineering ethics cases.



## Types of utilitarianism:

There are many flavors of the basic tenets of utilitarianism. Two of these are **act utilitarianism** and **rule utilitarianism**. (Act utilitarianism focuses on individual actions rather than on rules. The best known proponent of act utilitarianism was John Stuart Mill (1806–1873), who felt that most of the common rules of morality (e.g., don't steal, be honest, don't harm others) are good guidelines derived from centuries of human experience. However, Mill felt that individual actions should be judged based on whether the most good was produced in a given situation, and rules should be broken if doing so will lead to the most good.)

Rule utilitarians hold that although adhering to these rules might not always maximize good in a particular situation, overall, adhering to moral rules will ultimately lead to the most good.