Figure 1.1. Man leaving car at an almost-expired meter

1.1 What is Probability?

Will it rain tomorrow? Tomorrow, the answer will be known for sure; today, it can only be guessed. Such a guess can be expressed as probability. Suppose the weatherwoman says: "the probability of rain tomorrow is 60%." This means the weather bureau has searched the weather records of many years. They picked out those days on which the weather conditions were very much like today's. Then they looked at the weather on the day following. The weather woman is saying that 60% of all days with today's weather were followed by a day that rained. Tomorrow's real weather will be added to the weather records. As the weather records grow, the weatherwoman's predictions become more and more accurate – like the paradigm in AI. Luckily, weighing of chances in gambling is not this laborious.

If an event can happen in 10 different ways, all of which are equally likely and none has influence on another, and if 3 of those are defined as favorable, the probability p of a favorable result is 3/10. Similarly, if an event can happen in n different ways, all of which are equally likely, and if f of these are defined as favorable, the probability p of a favorable result is f/n.

$$p = f/n$$

The letter p is used here because it is the initial letter of "probability."

To illustrate this definition, suppose you have 2 white marbles and 3 black marbles in an opaque bag.