

## Shanghai Museum Visit Problem

Shanghai is home to several world-class museums. Two of the most popular are the "Shanghai Museum" and the "Shanghai Science and Technology Museum." A group of students visiting Shanghai has a day to visit museums. They decide to visit a museum in the morning and can either stay at the same museum for the whole day or switch to the other museum for the afternoon.



Given the following probabilities:

1. The probability that the students choose the Shanghai Museum for the morning visit is 0.65.
2. If the students visit the Shanghai Museum in the morning, the probability they stay there for the whole day is 0.5.
3. If the students visit the Shanghai Science and Technology Museum in the morning, the probability they switch to the Shanghai Museum in the afternoon is 0.55.

Questions:

1. Draw a tree diagram to represent the students' museum visit choices.
2. What is the probability that the students visit the Shanghai Museum for the morning visit and stay there for the whole day?
3. What is the probability that the students visit different museums for the morning and afternoon visits?
4. Given that the students are at the Shanghai Museum in the afternoon, what is the conditional probability they were also at the Shanghai Museum in the morning?

### Suzhou Culinary Choice Problem

In Suzhou, two popular traditional dishes are "Squirrel-shaped Mandarin Fish" and "Whitebait Omelette." A tourist visiting Suzhou decides to dine at a local restaurant that specializes in these dishes. The restaurant offers a set menu where diners can choose a starter and a main course. For the starter, they can choose between a small portion of the Squirrel-shaped Mandarin Fish or the Whitebait Omelette. For the main course, they can choose a larger portion of either dish. Given the following probabilities:



1. The probability that a diner chooses the Squirrel-shaped Mandarin Fish as a starter is 0.6.
2. If a diner chooses the Squirrel-shaped Mandarin Fish as a starter, the probability they also choose it as a main course is 0.7.
3. If a diner chooses the Whitebait Omelette as a starter, the probability they choose the Squirrel-shaped Mandarin Fish as a main course is 0.4.

Questions:

1. Draw a tree diagram to represent the diner's choices.
2. What is the probability that a diner chooses the Squirrel-shaped Mandarin Fish for both the starter and the main course?
3. What is the probability that a diner chooses different dishes for the starter and the main course?