Heat and mass (moisture) transfer during deep fat frying of frozen homogeneous foods was modeled. The calculation procedure was divided into two parts: the initial heating period and the surface boiling period, which was controlled by the surface temperature of fried foods. The published equation for the surface temperature calculation was modified and solved using an explicit finite difference. The enthalpy method was used to model the heat transfer within the sample core region in order to eliminate any problem associated with the unfrozen/frozen-moving boundary, while the moisture transfer was expressed by Fick's law of diffusion assuming a constant diffusivity. The models were verified with the data from the experiments and data available in the literature. It was found that good agreement between the simulated and experimental results was found, not only for frozen samples but also for unfrozen samples.