WEEK 4 PROJECT

JASON FENG

PROBLEM 1

- Result **Match** my expectation

	Expected Mean	Fitted Mean	Exp SD	Fitted SD
Classical Brownian	100	100	0.02	0.02
Arithmetic Return	100	100	2	2
Geometric Return	4.6	4.56	0.02	0.02

For the Classical Brownian Motion:

$$P_t = P_{t-1} + r_t$$

For the Arithmetic Return System:

$$P_t = P_{t-1}\left(1 + r_t\right)$$

For the Geometric Brownian Motion:

$$P_t = P_{t-1} e^{r_t}$$

PROBLEM 2

- Calculate the VaR for INTC
- Normal, Normal with EWV and MLE **similar** and **good performance**
- Historic Simulation different (1% VaR Larger, 5% VaR Smaller)

	1% VaR	5% VaR
Normal Distribution	-4.87%	-3.44%
Normal with EWV	-3.70%	-2.61%
MLE fitted T distribution	-4.92%	-2.63%
Historic Simulation	-11.72%	-2.06%
Empirical Distribution (in sample)	-6.28%	-2.07%
Empirical Distribution (out sample)	-5.86%	-2.63%

PROBLEM 3

- Calculate VaR for portfolio
- Delta VaR, MC VaR, MC VaR with KDE **similar**
- Historical VaR and Historical VaR with KDE **different**
- Historical VaR with KDE measure **higher risk**

Portfolio	PV	Delta VaR	MC VaR	MC VaR KDE	Historical	His VaR KDE
A	364,532.9604	6003.221298	6031.353035	6133.180296	5298.490899	6607.530596
B	326,770.1488	4886.596042	4713.121717	4877.027258	5576.130248	5948.630563
C	326,727.670717	3679.556069	3678.559149	3809.341859	3307.758233	3987.124178
All	1,018,030.78	14100.55012	14159.42006	14209.99006	12460.87375	15411.86675