# Class 5 – July 22th Notes

## Slide 6

Enter the amount to wager on the Celtics to win the NBA Championship:  10
Enter the amount to wager on the Thunder to win the NBA Championship:  10
Enter the amount to wager on the Nuggets to win the NBA Championship:  10
Enter the amount to wager on the Wolves to win the NBA Championship:  10
Enter the number of simulations you wish to run:  10

In your simulation:

The Celtics won 4 times.
The Thunder won 2 times.
The Nuggets won 2 times.
The Wolves won 0 times.

Your average simulated winnings are: $44.00

```python
def prequalify_loan(val, bal):
    equity_left = val-bal
    laon_amt = 0.3*equity_left
    return laon_amt

def main():
    val = int(input("Enter the value of home: "))
    bal = int(input("Enter the balance on current mortgage: "))
    x = prequalify_loan(val, bal)
    print("You pre-qualify for a ${:,.0f} home quity loan".format(x))

main()

You pre-qualify for a $45,000 home quity loan
```

# Slide 9

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```python
import math

def n_cal(FV, PMT, N, I_Y):
    r = I_Y / 100
    n = math.log((FV*r/PMT) + 1)/math.log(1+r)
    return n

def fv_annutiy(FV, PMT, N, I_Y):
    futVal = 0
    for i in range(N):
        futVal += PMT*(1+I_Y/100)**i
    return futVal

def pmt_annutiy(FV, PMT, N, I_Y):
    pmt_cal = 0
    r = I_Y / 100
    pmt_cal = FV * r / ((1 + r)**N - 1)
    return pmt_cal
```

```python
def main():
    savings_goal = float(input("Enter the retirement savings goal: "))
    budget = float(input("Enter the yearly savings budget: "))
    n = int(input("Enter the number of years until retirement: "))
    i_y = float(input("Enter the interest rate: "))
    FV_cal = fv_annutiy(savings_goal, budget, n, i_y)
    print("Savings ${} per year, in {} years you will have saved $
{:.2f} @ {:.2f}%".format(budget, n, FV_cal, i_y))
    PMT_cal = pmt_annutiy(savings_goal, budget, n, i_y)
    print("In order to save ${} within {} years, you would need to
save ${:.2f} each year @ {:.2f}%".format(savings_goal, n, PMT_cal,
i_y, ',.2f'))
    yrs_time = n_cal(savings_goal, budget, n, i_y)
    print("Saving {:,.0f} per year, it will take {} year to save $
{:,.0f} @ {:.2f}%".format(budget, round(yrs_time), savings_goal, i_y))

main()
```

```
Savings $25000.0 per year, in 15 years you will have saved $539464.09
@ 5.00%
In order to save $1000000.0 within 15 years, you would need to save
$46342.29 each year @ 5.00%
Saving 25,000 per year, it will take 23 year to save $1,000,000 @
5.00%
```

Slide 16

## Exercise 3: NBA Finals Wagering - Recreate the Following

Enter the amount to wager on the Celtics to win the NBA Championship:  10
Enter the amount to wager on the Thunder to win the NBA Championship:  10
Enter the amount to wager on the Nuggets to win the NBA Championship:  10
Enter the amount to wager on the Wolves to win the NBA Championship:  10
Enter the number of simulations you wish to run:  10

In your simulation:

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The Thunder won 2 times.
The Nuggets won 2 times.
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## Exercise 3: NBA Finals Wagering - Recreate the Following

```
Enter the amount to wager on the Celtics to win the NBA Championship:  10
Enter the amount to wager on the Thunder to win the NBA Championship:  10
Enter the amount to wager on the Nuggets to win the NBA Championship:  10
Enter the amount to wager on the Wolves to win the NBA Championship:  10
Enter the number of simulations you wish to run:  10
```

```
In your simulation:

The Celtics won 4 times.
The Thunder won 2 times.
The Nuggets won 2 times.
The Wolves won 0 times.


Your average simulated winnings are: $44.00
```

```python
### Class 5Ex3 Shell
###Initialize Variables
import random as rand
cpay=3
tpay=7.5
npay=8.5
wpay=10
cprob=.25
tprob=.12
nprob=.11
wprob=.09

###Gather User Input
CL=float(input("Enter the amount to wager on the Celtics to win the
NBA Championship: "))
TH=float(input("Enter the amount to wager on the Thunder to win the
NBA Championship: "))
NG=float(input("Enter the amount to wager on the Nuggets to win the
NBA Championship: "))
WL=float(input("Enter the amount to wager on the Wolves to win the NBA
Championship: "))
```

```python
x=int(input("Enter the number of simulations you wish to run: "))

c=0
t=0
n=0
w=0
for i in range(x):
    random = rand.uniform(0,1)
    if (random<=cprob):
        c+=1
    elif (random<=cprob+tprob):
        t+=1
    elif (random<=cprob+tprob+nprob):
        n+=1
    elif (random<=cprob+tprob+nprob+wprob):
        w+=1


simpay = (cpay*CL*c + tpay*TH*t + npay*NG*n + wpay*WL*w)/(CL+TH+NG+WL)

###output
print("\n\nIn your simulation:")
print("\nThe Celtics won {0:1,d} times.".format(c))
print("The Thunder won {0:1,d} times.".format(t))
print("The Nuggets won {0:1,d} times.".format(n))
print("The Wolves won {0:1,d} times.".format(w))
print("\n\nYour average simulated winings are:
$",format(simpay,',.0f'),sep="")



In your simulation:

The Celtics won 2 times.
The Thunder won 2 times.
The Nuggets won 0 times.
The Wolves won 2 times.


Your average simulated winings are: $10
```