HW 1
MFE 408: Fixed Income
Professor Longstaff
Group 9
Students: Yuhua Deng, Xiahao Wang, Nupur Solanki, Haoxuan Tong

Qn1

Assume the face value of the bond at maturity is 100

```
ytm <- 0.01 # semiannual payment
cf <- c(rep(5,49),105) # cf of 5 dollar every 6 month

discount <- 1 / (ytm + 1)^seq(1,50,1)
price <- sum(cf * discount)
cat("Bond price is ", price)
```

```
## Bond price is  256.7845
```

Qn2

```
cf <- 6.25
discount <- 0.07

price <- cf/(discount/2)
cat("willing to pay ", price)
```

```
## willing to pay  178.5714
```

Qn3

Assume the first month you receive both downpayment and monthly payment

```
# figure out the cash flow
cf <- rep(14000,120)
r <- 0.04/12
d <- (1+r)^(seq(119,0,-1))
accSum <- sum(d * cf) + 1000000*(1+r)^120
cat("Accummulative sum is ", accSum)
```

```
## Accummulative sum is  3552330
```

Qn4

```
g <- 0.03
div <- 10
r <- 0.12
p <- div /(r - g)
cat("Willing to pay: ", p)
```

```
## Willing to pay:  111.1111
```

Qn 5

```
cf1 <- 1000
r <- 0.1
cf <- cf1 * (1+r)^seq(0,5,1)
cf <- c(cf, rep(1610.51,24))

discount <- 1/(1.035^(seq(1,30,1)))
pv <- sum(cf * discount)

cat("PV: ", pv)
```

```
## PV:  27826.05
```

Qn 6

```
annuity <- 10000
# 25 years in total
n <- 25
discount <- 1/1.03^(seq(1,n,1))
cf <- rep(annuity, n)
pv_21 <- sum(cf * discount)
pv <- pv_21 /((1.03)^20)
cat("Annuity PV: ", pv)
```

```
## Annuity PV:  96412.38
```

Qn 7

```
library(FinCal)
FV <- 1000
r <- 0.03
cf1 <- c(rep(FV*r, 39),1030)
cf <- c(-893.22, cf1)

cat("YTM is: ", irr(cf)*2)
```

```
## YTM is:  0.06996525
```