hw2-Q2

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```
options(digits=20)
```

.Machine$double.eps

.Maitchine$double.eps is the smallest positive floating- point number as it equals to 2^(-52)

```
.Machine$double.eps
```

```
## [1] 2.2204460492503130808e-16
```

```
1+  .Machine$double.eps==1
```

```
## [1] FALSE
```

```
1-  .Machine$double.eps==1
```

```
## [1] FALSE
```

```
.Machine$double.base ^ (.Machine$double.ulp.digits) == .Machine$double.eps
```

```
## [1] TRUE
```

.Machine$double.neg.eps

.Machine$double.neg.eps is a small positive floating-point number which equals to 2^(-52-1L).Also, it is the smallest positive number such that 1+x==1

```
.Machine$double.neg.eps
```

```
## [1] 1.1102230246251565404e-16
```

```
 .Machine$double.base ^ (.Machine$double.ulp.digits -
1L)==.Machine$double.neg.eps
```

```
## [1] TRUE
```

```
1- .Machine$double.neg.eps==1
```

```
## [1] FALSE
```

```
1+ .Machine$double.neg.eps==1
```

```
## [1] TRUE
```

```
1+ .Machine$double.base ^ (.Machine$double.ulp.digits - 2L)==1
```

```
## [1] TRUE

1+ .Machine$double.base ^ (.Machine$double.ulp.digits - 3L)==1

## [1] TRUE
```

.Machine$double.xmax

.Machine$double.xmax is a large normalized floating-point number, but not the largest number in my machines. In some machines, it may be the largest number.

```
.Machine$double.xmax

## [1] 1.7976931348623157081e+308

(1 - .Machine$double.neg.eps) * .Machine$double.base ^
.Machine$double.max.exp

## [1] Inf

(1 - .Machine$double.neg.eps) * .Machine$double.base ^
.Machine$double.max.exp ==.Machine$double.xmax

## [1] FALSE
```

.Machine$double.xmin

.Machine$double.xmin is the smallest postive normalized floating-point number equals 2^{-1022}

```
.Machine$double.xmin

## [1] 2.2250738585072013831e-308

.Machine$double.base ^ (.Machine$double.min.exp)

## [1] 2.2250738585072013831e-308

.Machine$double.base ^ (.Machine$double.min.exp) == .Machine$double.xmin

## [1] TRUE
```