In [1]:
```
file = open('adult.data', 'r')
```

In [2]:
```
def chr_int(a):
    if a.isdigit():
        return int(a)
    else:
        return 0

data=[]
for line in file:
     data1=line.split(', ')
     if len(data1)==15:
        data.append([chr_int(data1[0]),data1[1],chr_int(data1[2]),data1[3],chr_int(data1[
            data1[7],data1[8],data1[9],chr_int(data1[10]),chr_int(data1[11]),chr_int(data
            data1[14]])
```

In [3]:
```
print data[1:2]
```

```
[[50, 'Self-emp-not-inc', 83311, 'Bachelors', 13, 'Married-civ-spouse', 'Exec-manageria
l', 'Husband', 'White', 'Male', 0, 0, 13, 'United-States', '<=50K\n']]
```

In [4]:
```
%matplotlib inline
import pandas as pd

df = pd.DataFrame(data) #  Two-dimensional size-mutable, potentially heterogeneous tabula

df.columns = ['age', 'type_employer', 'fnlwgt', 'education',
                "education_num","marital", "occupation", "relationship", "race","sex",
                "capital_gain", "capital_loss", "hr_per_week","country","income"]
df.head()
```

Out[4]:

	age	type_employer	fnlwgt	education	education_num	marital	occupation	relationship	race	sex
0	39	State-gov	77516	Bachelors	13	Never-married	Adm-clerical	Not-in-family	White	Male
1	50	Self-emp-not-inc	83311	Bachelors	13	Married-civ-spouse	Exec-managerial	Husband	White	Male
2	38	Private	215646	HS-grad	9	Divorced	Handlers-cleaners	Not-in-family	White	Male
3	53	Private	234721	11th	7	Married-civ-spouse	Handlers-cleaners	Husband	Black	Male
4	28	Private	338409	Bachelors	13	Married-civ-spouse	Prof-specialty	Wife	Black	Female

In [5]:
```
ml = df[(df.sex == 'Male')] # grouping by sex
ml.shape
```

Out[5]: (21790, 15)

In [6]:
```
ml1 = df[(df.sex == 'Male')&(df.income=='>50K\n')]
ml1.shape
```

Out[6]: (6662, 15)

In [7]:
```
fm =df[(df.sex == 'Female')]
fm.shape
```

Out[7]: (10771, 15)

In [8]:
```
fm1 =df[(df.sex == 'Female')&(df.income=='>50K\n')]
fm1.shape
```

Out[8]:
```
(1179, 15)
```

Calculating mean, standard deviation and variance using numpy

In [9]:
```
import numpy as np
average_age_men = np.mean(ml['age'])
print average_age_men
```

```
39.4335474989
```

In [10]:
```
std_age_men = np.std(ml['age'])
print std_age_men
```

```
13.3703233824
```

In [11]:
```
var_age_men = np.var(ml['age'])
print var_age_men
```

```
178.765547351
```

In [12]:
```
median_age_men = np.median(ml['age'])
print median_age_men
```

```
38.0
```

In [13]:
```
upper_quartile_age_men = np.percentile(ml['age'],75)
print upper_quartile_age_men
```

```
48.0
```

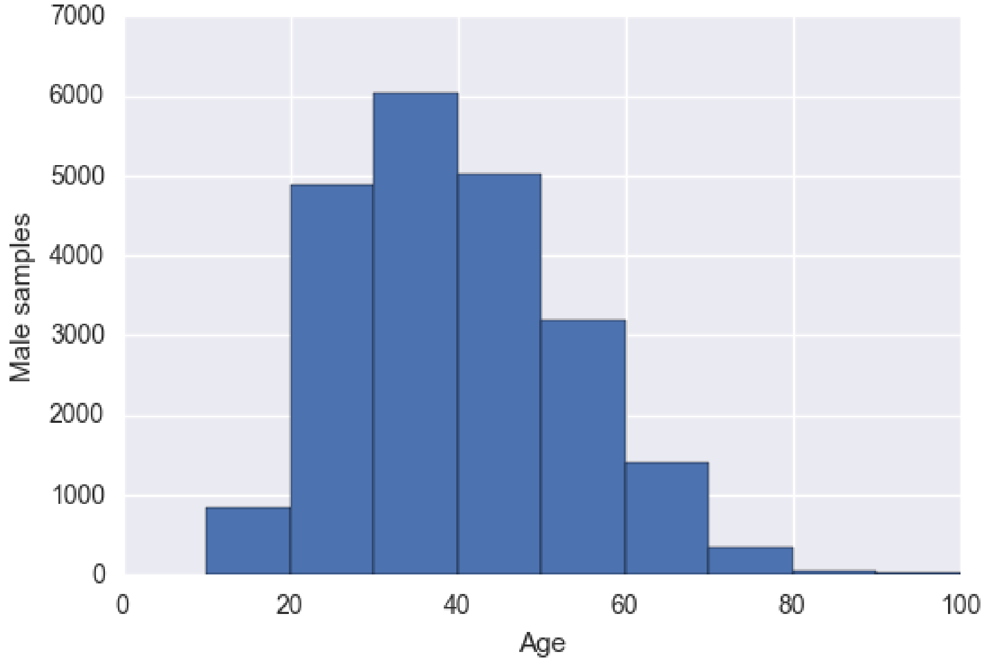
In [14]:
```
lower_quartile_age_men = np.percentile(ml['age'],25)
print lower_quartile_age_men
```

```
29.0
```

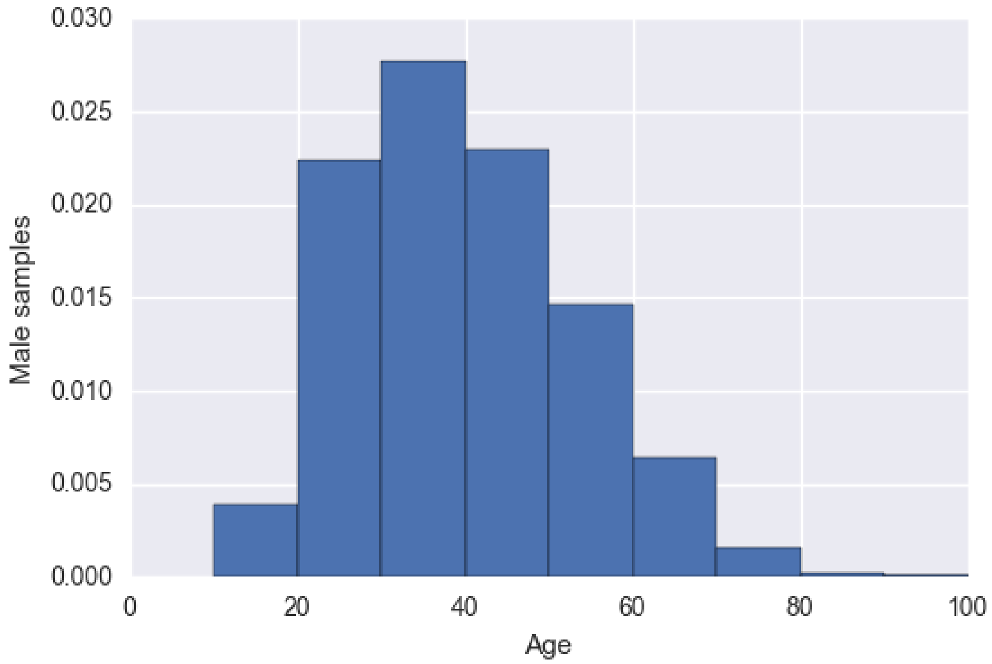
In [15]:
```
iqr_age_men = upper_quartile_age_men - lower_quartile_age_men
print iqr_age_men
```

```
19.0
```

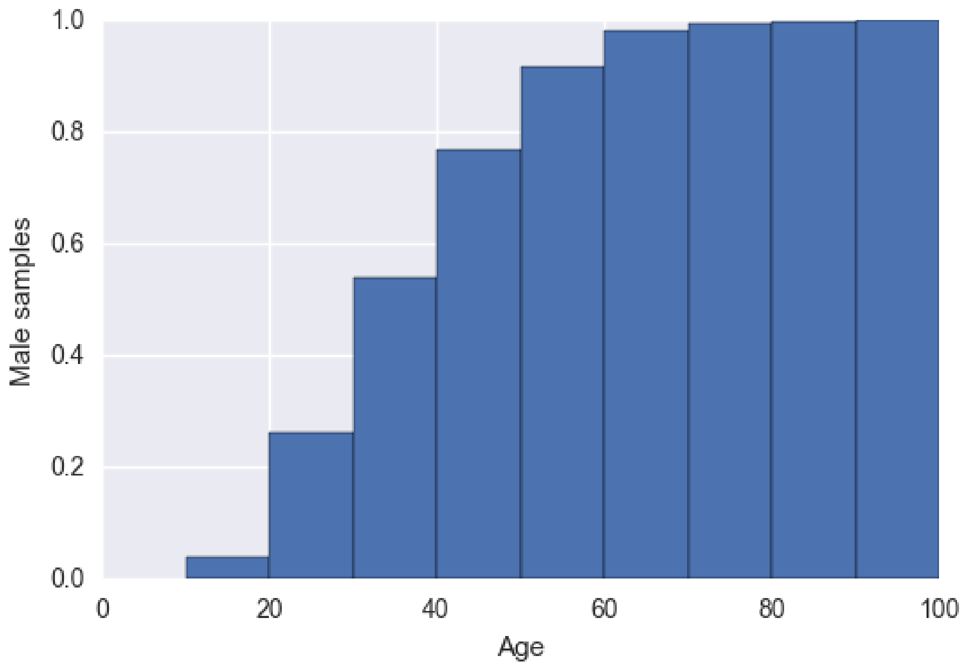
In [16]:
```
import matplotlib.pyplot as plt
import seaborn as sns
sns.set()
bin_edges = [0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100]
_ = plt.hist(ml['age'], bins = bin_edges)
_ = plt.xlabel('Age')
_ = plt.ylabel('Male samples')
plt.show()
```



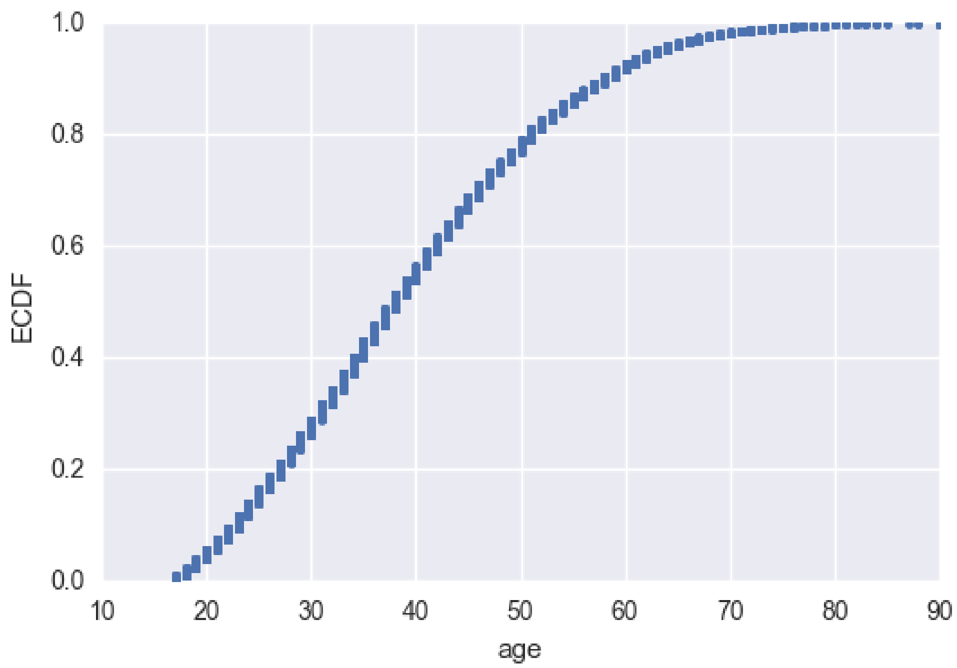
In [17]:
```
import matplotlib.pyplot as plt
bin_edges = [0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100]
_ = plt.hist(ml['age'], bins=bin_edges, normed = 1)
_ = plt.xlabel('Age')
_ = plt.ylabel('Male samples')
plt.show()
```



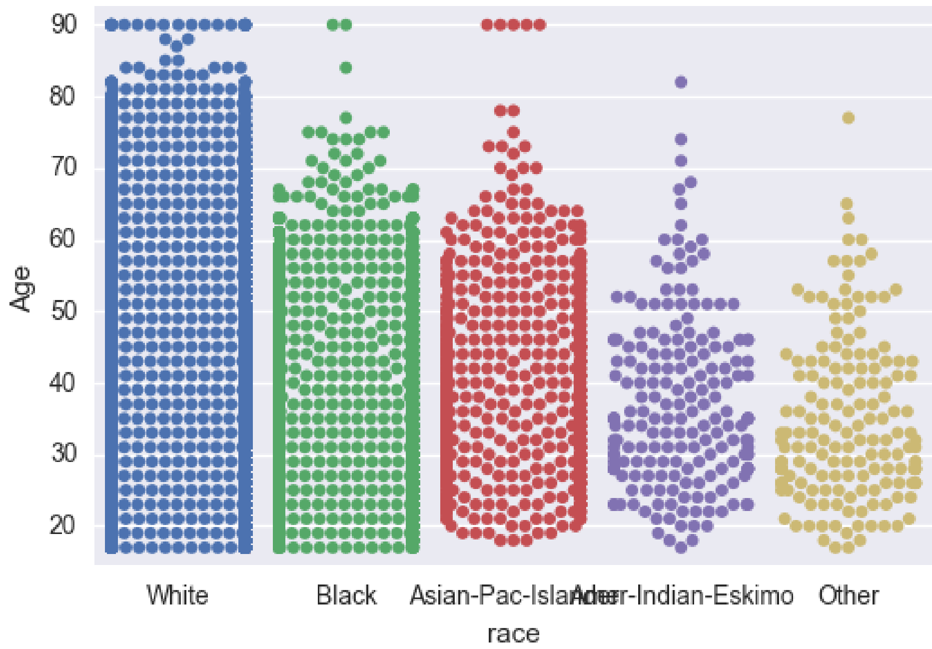
In [18]:
```
_ = plt.hist(ml['age'], bins=bin_edges, cumulative=True, normed = 1)
_ = plt.xlabel('Age')
_ = plt.ylabel('Male samples')
plt.show()
```



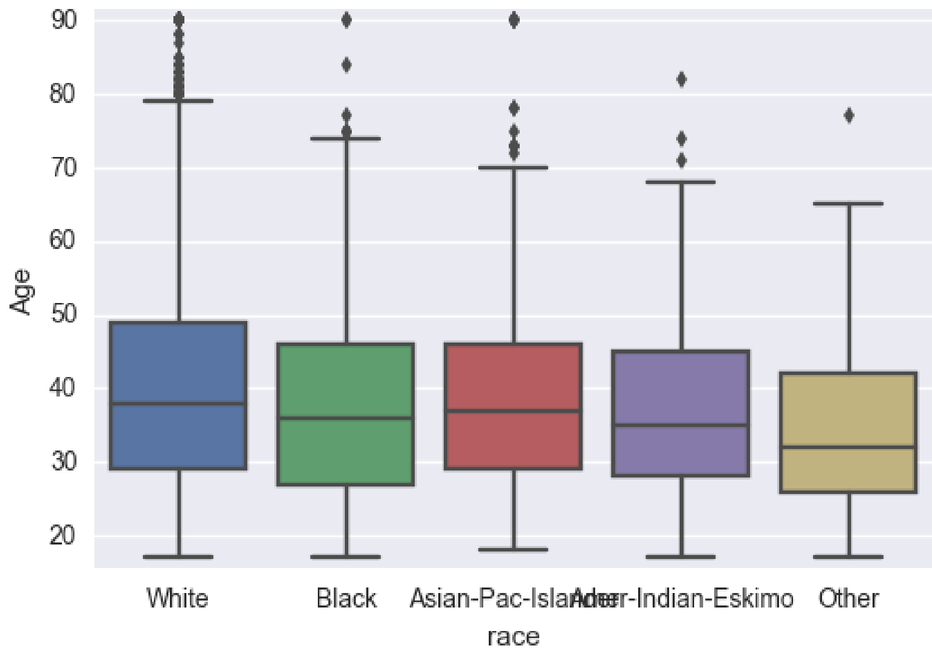
In [19]:
```
x = np.sort (ml['age'])
y = np.arange(1.0, len(x)+1)/len(x)
_ = plt.plot(x, y, marker = '.', linestyle = 'none')
_ = plt.xlabel ('age')
_ = plt.ylabel ('ECDF')
plt.show()
```



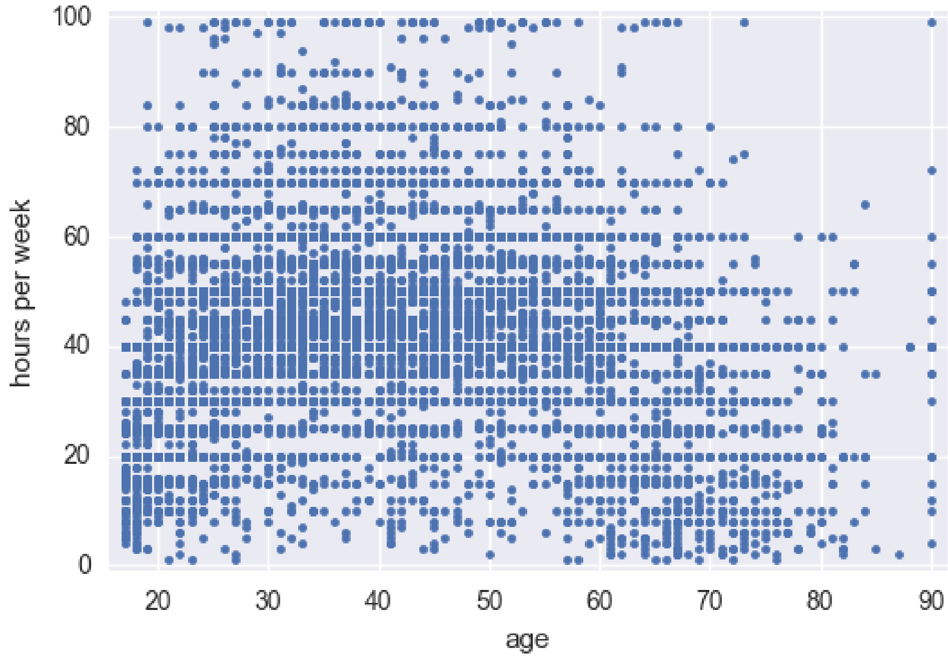
In [20]:
```
import seaborn as sns
sns.set()
_ = sns.swarmplot(x= 'race', y = 'age', data = ml)
_ = plt.margins(0.02)
_ = plt.xlabel ('race')
_ = plt.ylabel ('Age')
plt.show()
```



In [21]:
```
import seaborn as sns
sns.set()
_ = sns.boxplot(x = 'race', y = 'age', data = ml)
_ = plt.margins(0.02)
_ = plt.xlabel ('race')
_ = plt.ylabel ('Age')
plt.show()
```



In [22]:
```
_ = plt.plot(ml['age'], ml['hr_per_week'], marker = '.', linestyle = 'none')
_ = plt.margins(0.02)
_ = plt.xlabel ('age')
_ = plt.ylabel ('hours per week')
plt.show()
```

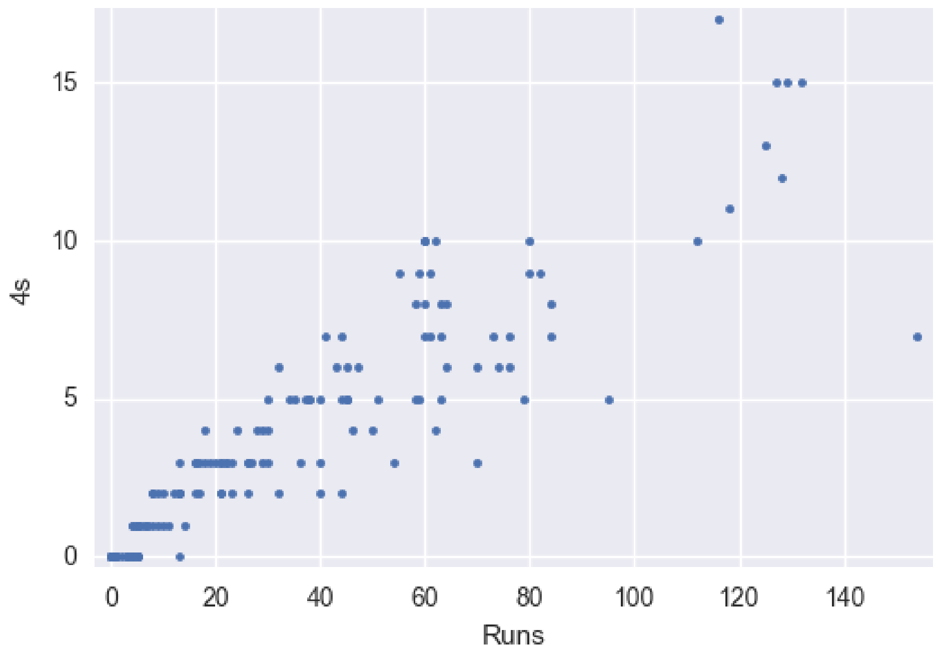


In [23]:
```
batsman = pd.read_excel('batsman.xlsx')
batsman.head()
```

Out[23]:

	Runs	Mins	BF	4s	6s	SR	Pos	Dismissal	Inns	Start Date
1	5	10	8	0	0	62.50	1	caught	1	2007-02-09
2	30	40	32	3	2	93.75	1	caught	2	2007-02-10
3	7	27	20	1	0	35.00	2	run out	2	2007-04-19
4	45	81	53	6	0	84.90	2	caught	1	2007-05-10
5	7	22	12	1	0	58.33	2	run out	2	2007-05-12

In [24]:
```
_ = plt.plot(batsman['Runs'], batsman['4s'], marker = '.', linestyle = 'none')
_ = plt.margins(0.02)
_ = plt.xlabel ('Runs')
_ = plt.ylabel ('4s')
plt.show()
```



In [25]:
```
covariance_matrix = np.cov(ml['hr_per_week'],ml['age'])
print covariance_matrix
print "Covariance = ", covariance_matrix [0][1]
```

```
[[ 146.88846717    5.5298026 ]
 [   5.5298026   178.77375175]]
Covariance =  5.52980260364
```

In [26]:
```
pearson_coefficient = np.corrcoef(ml['hr_per_week'],ml['age'])
print pearson_coefficient
print "Pearson's correlation coefficient = " , pearson_coefficient [0][1]
```

```
[[ 1.          0.03412431]
 [ 0.03412431  1.        ]]
Pearson's correlation coefficient =  0.0341243118412
```

In [27]:
```
covariance_matrix1 = np.cov(batsman['Runs'], batsman['4s'])
print covariance_matrix1
print "Covariance between runs and 4s= ", covariance_matrix1 [0][1]
```

```
[[ 1169.20642119   112.07718121]
 [  112.07718121    13.16724107]]
Covariance between runs and 4s=  112.077181208
```

In [28]:
```
pearson_coefficient1 = np.corrcoef(batsman['Runs'], batsman['4s'])
print pearson_coefficient1
print "Pearson correleation coefficient between runs and 4s= ", pearson_coefficient1 [0][
```

```
[[ 1.          0.90328378]
 [ 0.90328378  1.        ]]
Pearson correleation coefficient between runs and 4s=  0.90328377718
```