

# High Performance Computing

## Homework 4

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### **Problem 1**

a)

- Option 1: `grep ^[/#] cardinals.txt | wc -l`  
Output : 53
- Option 2: `awk 'END{print NR-1}' cardinals.txt`  
Output : 53

b) `sort -nk3 cardinals.txt`

Output:

| #Player          | Number | Pos | HT   | WT  | Age | Exp | College              |
|------------------|--------|-----|------|-----|-----|-----|----------------------|
| Andy Lee         | 2      | P   | 6-1  | 185 | 36  | 15  | Pittsburgh           |
| Josh Rosen       | 3      | QB  | 6-4  | 218 | 21  | R   | UCLA                 |
| Phil Dawson      | 4      | K   | 5-11 | 200 | 43  | 20  | Texas                |
| Mike Glennon     | 7      | QB  | 6-6  | 229 | 28  | 6   | North Carolina State |
| Sam Bradford     | 9      | QB  | 6-4  | 224 | 30  | 9   | Oklahoma             |
| Chad Williams    | 10     | WR  | 6-1  | 204 | 23  | 2   | Grambling State      |
| Larry Fitzgerald | 11     | WR  | 6-3  | 218 | 35  | 15  | Pittsburgh           |
| Christian Kirk   | 13     | WR  | 5-11 | 200 | 21  | R   | Texas A&M            |
| J.J. Nelson      | 14     | WR  | 5-10 | 160 | 26  | 4   | Alabama-Birmingham   |
| Trent Sherfield  | 16     | WR  | 6-1  | 205 | 22  | R   | Vanderbilt           |
| Deone Bucannon   | 20     | LB  | 6-1  | 211 | 26  | 5   | Washington State     |
| Patrick Peterson | 21     | CB  | 6-1  | 203 | 28  | 8   | LSU                  |
| T.J. Logan       | 22     | RB  | 5-10 | 196 | 24  | 2   | North Carolina       |
| Bene Benwikere   | 23     | CB  | 6-0  | 195 | 27  | 5   | San Jose State       |
| Brandon Williams | 26     | CB  | 6-0  | 200 | 26  | 3   | Texas A&M            |
| Jamar Taylor     | 28     | CB  | 5-11 | 192 | 28  | 6   | Boise State          |
| Chase Edmonds    | 29     | RB  | 5-9  | 210 | 22  | R   | Fordham              |
| Rudy Ford        | 30     | S   | 5-11 | 204 | 23  | 2   | Auburn               |
| David Johnson    | 31     | RB  | 6-1  | 224 | 26  | 4   | Northern Iowa        |
| Derrick Coleman  | 32     | FB  | 6-0  | 233 | 27  | 5   | UCLA                 |
| Tre Boston       | 33     | S   | 6-1  | 205 | 26  | 5   | North Carolina       |
| Budda Baker      | 36     | S   | 5-10 | 195 | 22  | 2   | Washington           |
| Deatrick Nichols | 39     | CB  | 5-10 | 189 | 24  | R   | South Florida        |
| Antoine Bethea   | 41     | S   | 5-11 | 206 | 34  | 13  | Howard               |
| Haason Reddick   | 43     | LB  | 6-1  | 235 | 24  | 2   | Temple               |
| Markus Golden    | 44     | DE  | 6-3  | 260 | 27  | 4   | Missouri             |
| Aaron Brewer     | 46     | LS  | 6-5  | 232 | 28  | 7   | San Diego State      |
| Zeke Turner      | 47     | LB  | 6-2  | 214 | 22  | R   | Washington           |
| Gerald Hodges    | 51     | LB  | 6-2  | 236 | 27  | 6   | Penn State           |
| Chandler Jones   | 55     | DE  | 6-5  | 265 | 28  | 7   | Syracuse             |
| Zach Moore       | 56     | DE  | 6-6  | 275 | 28  | 2   | Concordia-St. Paul   |
| Josh Bynes       | 57     | LB  | 6-1  | 235 | 29  | 7   | Auburn               |
| Joe Walker       | 59     | LB  | 6-2  | 236 | 25  | 3   | Oregon               |
| Daniel Munyer    | 62     | OL  | 6-1  | 305 | 26  | 2   | Colorado             |
| Mason Cole       | 64     | OL  | 6-5  | 292 | 22  | R   | Michigan             |

```
Justin Pugh      67 OL 6-5 311 28 6 Syracuse
Jeremy Vujnovich 68 OL 6-5 300 27 2 Louisiana Coll.
Andre Smith     71 OL 6-4 330 31 10 Alabama
Olsen Pierre    72 DT 6-4 293 27 3 Miami (Fla.)
John Wetzel     73 OL 6-7 328 27 3 Boston College
D.J. Humphries  74 OL 6-5 307 24 4 Florida
Blaine Clausell 75 OL 6-6 330 26 1 Mississippi State
Mike Iupati     76 OL 6-5 331 31 9 Idaho
Korey Cunningham 79 OL 6-6 305 23 R Cincinnati
Jermaine Gresham 84 TE 6-5 260 30 9 Oklahoma
Gabe Holmes     85 TE 6-4 255 27 3 Purdue
Ricky Seals-Jones 86 TE 6-5 243 23 2 Texas A&M
Robert Nkemdiche 90 DT 6-4 296 24 3 Mississippi
Benson Mayowa   91 DE 6-3 265 27 6 Idaho
Dennis Gardeck  92 LB 6-0 242 24 R Sioux Falls
Rodney Gunter   95 DT 6-5 305 26 4 Delaware State
Ifeadi Odenigbo 97 DE 6-3 275 24 1 Northwestern
Corey Peters    98 DT 6-3 305 30 9 Kentucky
```

c) `sort -nk6 cardinals.txt | tail -5`

Output:

```
Justin Pugh      67 OL 6-5 311 28 6 Syracuse
John Wetzel     73 OL 6-7 328 27 3 Boston College
Andre Smith     71 OL 6-4 330 31 10 Alabama
Blaine Clausell 75 OL 6-6 330 26 1 Mississippi State
Mike Iupati     76 OL 6-5 331 31 9 Idaho
```

d) `grep Oklahoma cardinals.txt`

Output:

```
Sam Bradford     9 QB 6-4 224 30 9 Oklahoma
Jermaine Gresham 84 TE 6-5 260 30 9 Oklahoma
```

e) `grep QB cardinals.txt`

Output:

```
Sam Bradford     9 QB 6-4 224 30 9 Oklahoma
Mike Glennon     7 QB 6-6 229 28 6 North Carolina State
Josh Rosen       3 QB 6-4 218 21 R UCLA
```

f) `grep WR cardinals.txt | wc -l`

Output:

5

## **Problem 2**

a) `awk '!/#/{print $7}' cardinals.txt | stats | awk '{print $1}'`

Output:

26.6604

b) `awk '!/#/{print $7}' cardinals.txt | stats | awk '{print "Min:",$2,"\nMax", $3}'`

Output:

Min: 21

Max 43

c) `awk '$8=="R"{print $0}' cardinals.txt | stats | awk '{print $4}'`

Output:

9

d) `awk '!/^#/ && $8>8 && $8!="R"{print "Name:",$1,$2,"\tPos:",$4}' cardinals.txt`

Output:

```
Name: Antoine Bethea   Pos: S
Name: Sam Bradford     Pos: QB
Name: Phil Dawson      Pos: K
Name: Larry Fitzgerald Pos: WR
Name: Jermaine Gresham Pos: TE
Name: Mike Iupati      Pos: OL
Name: Andy Lee         Pos: P
Name: Corey Peters     Pos: DT
Name: Andre Smith      Pos: OL
```

e) `grep CB cardinals.txt | awk '{print $1,$2}'`

Output:

```
Bene Benwikere
Deatrick Nichols
Patrick Peterson
Jamar Taylor
Brandon Williams
```

### **Problem 3**

a) `height.awk`

```
#!/usr/bin/awk -f
```

```
# We assume the first and second field of the data file are the name
and
# last name, respectively.
# We assume the height is given in a format H-h where H is in feet and
h
# in inches.
```

```
/^#/{print $1,"\t\t", $4} # Display desired labels.
```

```
!/^#/{
    split($5,ht,/[-]/)
    inches = ht[1]*12+ht[2]
    print $1,$2,"\t\t",inches
}
```

b) `bmi.awk`

```
#!/usr/bin/awk -f
```

```
# We assume the first and second field of the data file are the name
and
# last name, respectively.
```

```
/^#/{print $1,"\t\t", $3,"\tBMI"} # Display desired labels.
```

```
!/^#/{
    split($5,ht,/[-]/)
    inches = ht[1]*12+ht[2]
    h = inches*0.0254
```

```
w = $6/2.2
bmi = w/h^2
print $1,$2,"\t\t",$4,"\t",bmi
}
```

- c) `bmi.awk cardinals.txt | awk '$4>30{print $1,$2,"\t",$4}'`

Output:

```
Josh Bynes      31.0693
Blaine Clausell 38.2151
Mason Cole      34.6985
Derrick Coleman 31.6666
Korey Cunningham 35.32
Chase Edmonds   31.0764
Dennis Gardeck  32.8897
Markus Golden   32.5657
Jermaine Gresham 30.896
Rodney Gunter   36.2433
Gerald Hodges   30.364
Gabe Holmes     31.1045
D.J. Humphries  36.481
Mike Iupati     39.3329
Chandler Jones  31.4901
Benson Mayowa   33.192
Zach Moore      31.8459
Daniel Munyer   40.324
Robert Nkemdiche 36.1056
Ifeadi Odenigbo 34.4445
Corey Peters    38.2021
Olsen Pierre    35.7397
Justin Pugh     36.9563
Haason Reddick  31.0693
Andre Smith     40.2529
Jeremy Vujnovich 35.6492
Joe Walker      30.364
John Wetzels    37.0279
```

- d) `bmi.awk cardinals.txt | awk '$3=="OL"{print $4}' | stats | awk '{print $1}'`

Output:

```
37.4258
```

e)

1. `bmi.awk cardinals.txt | awk '$3=="QB"{print $4}' | stats | awk '{print "Mean BMI of Quarterbacks",$1}'`

Output:

```
Mean BMI of Quarterbacks 26.8111
```

2. `bmi.awk cardinals.txt | awk '$3=="WR"{print $4}' | stats | awk '{print "Mean BMI of Wide Receivers",$1}'`

Output:

```
Mean BMI of Wide Receivers 26.4674
```