CS302 2012 Midterm – Answer Sheet

Name: _____

Email: _____

Question 1 – Put your answers below:

#	Final Vector (put one number in each box. Yes, there are too many boxes).															
1																
2																
3																
4																
5																
6																

Question 2A: Union By Height:

```
Elts:   0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Links:  4 -1 -1 11 -1 11  4  4 12 -1 11 -1  4 -1  4 11  1 20 10 13 -1  4 13 13
Ranks:  1  2  1  1  3  1  1  1  1  1  2  3  2  2  1  1  1  1  1  1  2  1  1  1

Union(20,4) =           Find(17) =                Find(18) =

Elts:   0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Links:
Ranks:
```

Question 2B: Union By Size:

```
Elts:   0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Links: 21 21  7 -1 10  3 15 -1 21 21 -1  4  7  7 10 10 22 -1  2  3 -1 -1 -1 22
Ranks:  1  1  2  3  2  1  1  5  1  1  6  1  1  1  1  2  1  1  1  1  1  5  3  1

Union(7,22) =              Find(11) =                  Find(23) =

Elts:   0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Links:
Ranks:
```

Question 2C: Union By Rank with Path Compression:

```
Elts:   0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Links: 19  7 21 20 19  7  9 -1  5 -1 14 17  1 21 -1  7  0 -1  7 -1  7 -1 17 -1
Ranks:  2  2  1  1  1  2  1  3  1  2  1  1  1  1  2  1  1  2  1  3  2  2  1  1

Union(14,7) =              Find(10) =                 Find(16) =

Elts:   0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Links:
Ranks:
```

Question 2D: Union By Rank with Path Compression:

```
Elts:   0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Links: 22  0 15  5 22 -1 14 15 -1  8 11 -1 16 20 -1 -1  5  7  0 -1 14  7 -1 22
Ranks:  2  1  1  1  1  3  1  2  2  1  1  2  1  1  3  3  2  1  1  1  2  1  3  1

Union(14,22) =               Find(13) =                Find(1) =

Elts:   0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Links:
Ranks:
```

Question 3:

State the running times:

A.
B.
C.
D.
E.
F.
G.
H.
I.
J.
K
L.
M.
N.
O.
P.

Question 4:

Identify the algorithms:

A.
B.
C.
D.
E.
F.
G.
H.