Computer Science 245

Homework 1

Algorithm Analysis I

Due Wednesday, February 4th, 2015

Give $\Theta()$ running times for each of the following code fragments. HINT – if you are having trouble with finding $\Theta()$, first find $O()$, then $\Omega()$. For partial credit, just find $O()$.

1. (2 points)

```
for(i=0; i<n; i++)
  for(j=n; j>0; j--)
    for(k=0; k<n; k++)
      A[i] = A[j] * A[k];
```

2. (2 points)

```
for(i=0; i<n; i++)
{
  for(j=n; j>0; j--)
      A[i] = A[j] * A[k];
  for(k=0; k<n; k++)
      A[i] = A[j] * A[k];
}
```

3. (2 points)

```
tmp = 0;
while (tmp < n) {
  for (tmp2=0; tmp2<n*n; tmp2++)
    sum++;
  tmp++;
}
```

4. (2 points)

```
for (i=1; i<n*n i=i+2)
  for (j=1; j<n*n; j=j+2)
    sum++;
```

5. (2 points)

```
for (i=1; i<n*n i=i+2)
{
  for (j=1; j<n*n; j=j+2)
    sum++;
  for (k=1; k<n; k=k+1)
    sum++;
}
```

6. (2 points)

```
for (i=1; i<n*n i=i*2)
  for (j=1; j<n*n; j=j+2)
    sum++;
```

7. (2 points)

```
for (j=0; j < n*n; j++)
  for(k=0; k<j*j; k++)
    sum++;
```

8. (2 points)

```
tmp1 = n;
while (tmp1 > 1) {
  tmp2 = 0;
  while (tmp2 < n/2) {
    tmp2++;
  }
  tmp1 = tmp1/2
}
```

9. (2 points)

```
for (tmp1=0; tmp1<n; tmp1++)
  for(tmp2=0; tmp2 < tmp1; tmp2++)
    for(tmp3=1; tmp3<n; tmp3 = tmp3*3)
      sum++;
```