DS Homework 2

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Problem 1

a.

```
procedure coeff(a, p):
    set i to 1

    while i <= avail:
        if a.expon[i] == p:
            return a.coef[i]
        end if

        set i to i + 1

    end while

    return -1
end procedure
```

b.

i. 4(One Integer) $*100$(100 terms) $*2$(member in the struct(power and coef)) $=800$bytes

ii. 4(One Integer) $*3$(3 terms) $*2$(member in the struct(power and coef)) $=24$bytes

iii. 4(One Integer) $*2$(2 terms) $*2$(member in the struct(power and coef)) $=16$bytes

c.

Yes, it saves space when it is sparse. But if the polynomial is not sparse, it costs a lot of time because it runs $O(n)$ to get coefficent which n is the non-zero terms in the polynomial.

Problem 2

a.

B^T	**row**	**col**	**value**
$B[0]$	5	9	8
$B[1]$	0	1	1
$B[2]$	0	8	2
$B[3]$	1	0	1
$B[4]$	1	8	-1
$B[5]$	2	0	2
$B[6]$	3	4	-1
$B[7]$	3	7	3
$B[8]$	4	6	2

b.

AxB	**row**	**col**	**val**
[0]	7	5	17
[1]	0	0	-2
[2]	0	1	2
[3]	0	2	2
[4]	0	3	-2
[5]	1	0	4
[6]	1	1	-2
[7]	2	0	-1
[8]	2	3	-3
[9]	3	0	4
[10]	3	1	-2
[11]	4	1	1
[12]	4	2	2
[13]	5	0	2
[14]	5	3	-4
[15]	6	1	-1
[16]	6	2	-2
[17]	6	3	6

c.

-2	**2**	**2**	**-2**	**0**
4	-2	0	0	0
-1	0	0	-3	0
4	-2	0	0	0
0	1	2	0	0
2	0	0	-4	0
0	-1	-2	6	0