Problem ST-3 (3 parts)   Pointers and Structures

Assuming a 32-bit system with 32-bit memory interface and 32-bit addresses, answer the following questions.

Part A: The following variables are allocated in memory beginning at address 5000. Complete the memory map below with the variable names at each word or byte in memory. Do not include the variable's value.

```
int        A;
int        B[] = {1, 2};
char       C = 'z';
char       D[] = "Hello";
int        *E;
char       *F;
```

Addr				
5000	A	→	→	→
5004	B[0]	→	→	→
5008	B[1]	→	→	→
5012	C	D[0]	D[1]	D[2]
5016	D[3]	D[4]	D[5]	slack
5020	E	→	→	→
5024	F	→	→	→

Part B: Suppose the following code follows the definitions in **Part A**. List the values of the listed variables following execution of this code.

```
E = B;
A = *E + E[1];
F = &(D[1]);
C = *F;
```

A	3	C	'e'	D	5013	E	5004	F	5014

Part C: Consider the following structure declaration.

```
struct State {
    int        Num;
    char       Name[NAMELENGTH];
    int        YearPop[NUMYEARS];
    float      Growth;
};
```

Suppose S is a pointer to a previously allocated and initialized State object. Write proper C statements to perform the following structure accesses.

Store initial year population in integer P	P = S->YearPop[0];
Store first character of Name in character C	C = S->Name[0];
Set Growth to percentage growth between years 0 and 1	S->Growth = 100.0 * (S->YearPop[1] – S->YearPop[0]) / S->YearPop[0];