Chapter 8

Pointers and Structure

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Pointers and Structure

There are 2 ways to Use structure members.

- Dot operator or Structure member operator

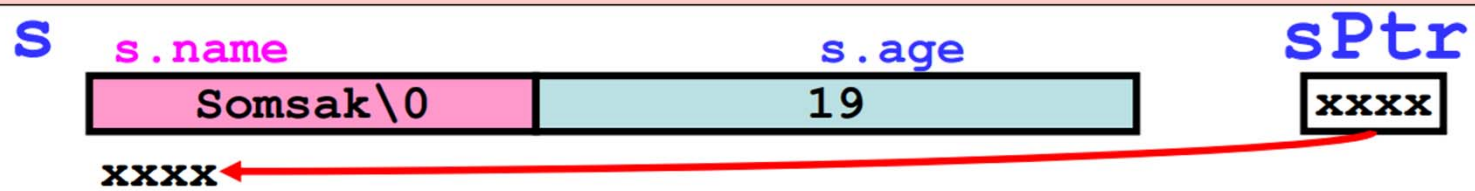
  Example struc_var.struc_member

- Structure pointer operator

  Example struc_Ptr->struc_member

Pointers and Structure

```
struct student{
        char name[40];
        int age ;
};
struct student s;
struct student *sPtr;
strcpy(s.name,“Somsak”);
s.age = 19;
sPtr = &s;
```

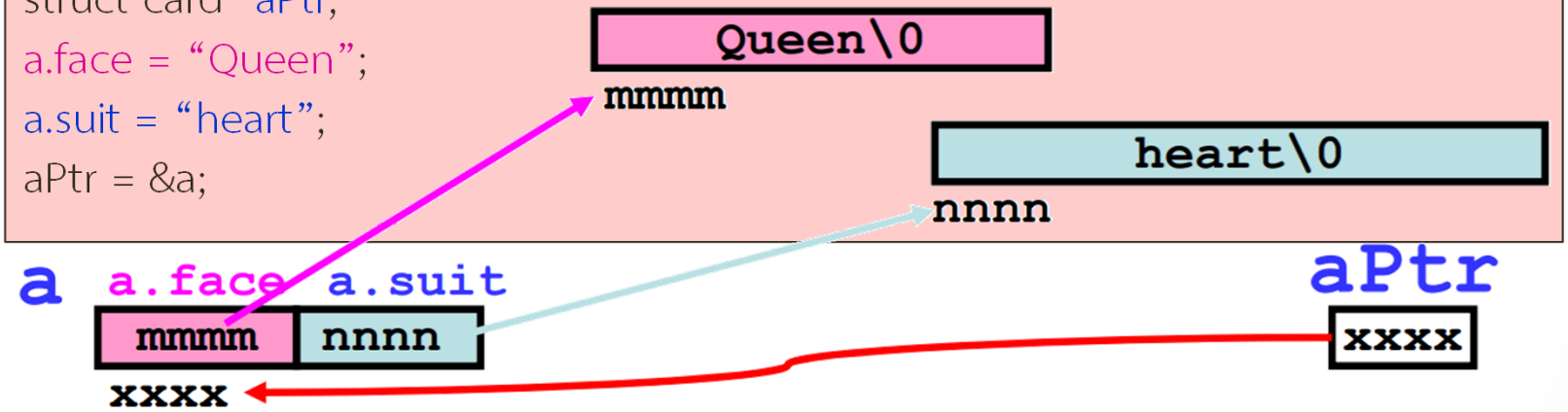


2 ways to print name of student.

- printf("%s", s.name);
- printf("%s", sPtr->name);

Pointers and Structure

```
struct card {
        char *face;
        char *suit;
};
struct card a;
struct card *aPtr;
a.face = “Queen”;
a.suit = “heart”;
aPtr = &a;
```

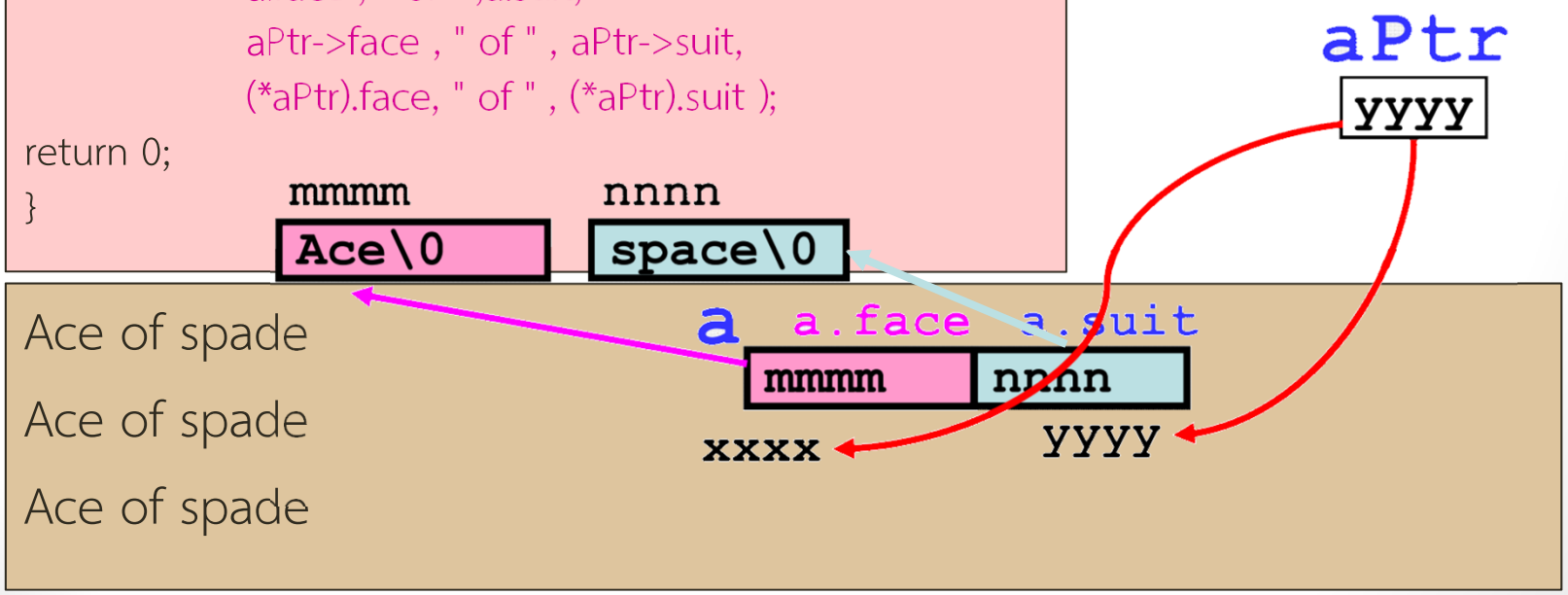


2 ways to print which set of card.

- printf("%s", s.suit);
- printf("%s", aPtr->suit);

Example : Pointers and Structures

```
int main(){
        struct card {
                char *face;      // 2,3,..,9,J,Q,K,A
                char *suit;      // space, heart, diamond, club
        };
  struct card a; struct card *aPtr;
  a.face = “Ace"; a.suit = “spade"; aPtr = &a;
  printf( "%s%s%s\n%s%s%s\n%s%s%s\n",
                a.face , " of " ,a.suit,
                aPtr->face , " of " , aPtr->suit,
                (*aPtr).face, " of " , (*aPtr).suit );
return 0;
}
```



Reference..www.ce.kmitl.ac.th King Mongkut’s Institute of Technology Ladkrabang

Example : Program get data of 10 students.

Write a program to get data of 10 students. The detail as below.

- Data consist of Name and age.
- Get students' data from keyboard.
- Use pointer point to structure
- After finish input the data, program will find the student who older than 20 years old and show on screen.

Example : Program get data of 10 students.

Student[0]
name:joy
age:12
Student[1]
name:boy
age:20
Student[2]
name:jo
age:23
Student[3]
name:pat
age:21
Student[4]
name:ple
age:13
Student[5]
name:tom
age:11
Student[6]
name:tu
age:25
Student[7]
name:tee
age:34
Student[8]
name:bat
age:44
Student[9]
name:phon
age:33

jo,23
pat,21
tu,25
tee,34
bat,44
phon,33

Example : Program get data of 10 students.

```
#include<stdio.h>
#include<conio.h>
int main()
{
struct profile{
char name[20];
int age;
} s[10];
int i;
struct profile *sPtr;
sPtr = s;
```

Example : Program get data of 10 students.

```
for (i=0; i<10; i++)
{
printf("Student # %d\n\tName :", i+1 );
scanf("%s",sPtr->name);
printf("\tAge:");
scanf("%d",&(sPtr->age));
sPtr++;
}
sPtr -= 10;
for (i=0; i<10; i++)
{
if ((sPtr->age) > 20)
printf("\n%s, %d",sPtr->name,sPtr->age);
sPtr++;
}
return 0;
}
```

Pointers and Strings

- **String** in C Language is character array with nul character at the end. It is 0 binary number 8 characters $(0000\ 0000)_2$ and used space 1 byte.
- Nul Character or escape sequence '0'
- **Zero number** ('0') or binary number is $(0011\ 0000)_2$
- **Pointer** that not point to any value. We can define with NULL which #defined at the header file of C compiler (NULL is the name of macro).
- Real value that keep in **Null Pointer** can be equal or not equal to zero. It depends on the program development system.

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Example

Example Get text “Ted” in difference case and end with nul character

```
char myString[40];

myString[0] = ‘T’;
myString[1] = ‘e’;
myString[2] = ‘d’;
myString[3] = ‘\0’;

char myString[40] = {‘T’, ‘e’, ‘d’, ‘\0’};

char myString[40] = “Ted”;
```

Example Setting pointer to NULL or comparison

```
ptr = NULL;
if (ptr == NULL) …
```

Example

```
#include <stdio.h>
	char strA[80] =
		"A string to be used for demonstration purposes";
	char strB[80];
int main(void)
{
	char *pA;
	char *pB;
	puts(strA);
	pA = strA;
	puts(pA);
	pB = strB;
	putchar('\n');
```

Example

```
while (*pA != '\0')
{
*pB++ = *pA++;
}
*pB = '\0';
puts(strB);
return 0;
}
```

Exercise

1. Create an array A size 3x3 to collect numbers 1-9 and show the result in the array by using pointer to reference number.

2. x and y is float variables, write a program to swap value of x and y by using pointer.

3. S is structure which keeps 3 numbers, write a program to collect the first and the second value into the structure and calculate the summation of 2 numbers and keep into the third number by using pointer to reference number.