

Tutorial 05

Question 1

What is printed by the following program? You should try to hand-trace the program to obtain the answer before running the program to verify.

```
In [1]: #include <stdio.h>

void printArray(int list[], int numElem);
void passElement(int num);
void changeElements(int list[]);
void copyArray(int list1[], int list2[], int numElem);

int main(void)
{
    int list1[5] = {11, 22, 33, 44, 55};
    int list2[5] = {99, 99, 99, 99, 99};
    printArray(list1, 5);
    passElement(list1[0]);
    printArray(list1, 5);
    changeElements(list2);
    printArray(list2, 5);
    copyArray(list2, list1, 5);
    printArray(list2, 5);
    return 0;
}

void printArray(int list[], int numElem)
{
    int i;
    for (i = 0; i < numElem; i++)
        printf("%d ", list[i]);
    printf("\n");
    return;
}

void passElement(int num)
{
    num = 1234;
    return;
}

void changeElements(int list[])
{
    list[2] = 77;
    list[4] = 88;
    return;
}

void copyArray(int list1[], int list2[], int numElem)
{
    int i;
    for (i = 0; i < numElem; i++)
        list1[i] = list2[i];
    return;
}
```

1. Initialize array `list1` & `list2`

```
In [ ]: int list1[5] = {11, 22, 33, 44, 55};
        int list2[5] = {99, 99, 99, 99, 99};
```

1. Call function `printArray(list1, 5)`, where `list1` is {11, 22, 33, 44, 55}

```
In [ ]: void printArray(list1, 5)
{
    int i;
    for (i = 0; i < 5; i++)
        printf("%d ", list[i]);
    printf("\n");
    return;
}
```

For $i = 0$ to 4, print out `list1[0]` to `list1[5]`

Then print new line.

Output 1:

11 22 33 44 55

1. Call function `passElement(list1[0])`, where `list1[0]` is 11.

```
In [ ]: void passElement(11)
{
    num = 1234;
    return;
}
```

1. Call function `printArray(list1, 5)`, where `list1` is {11, 22, 33, 44, 55}.

```
In [ ]: void printArray(list1, 5)
{
    int i;
    for (i = 0; i < 5; i++)
        printf("%d ", list[i]);
    printf("\n");
    return;
}
```

For $i = 0$ to 4, print out `list1[0]` to `list1[5]`

Then print new line.

Output 2:

11 22 33 44 55

1. Call function `changeElements(list2)`, where `list2` is {99, 99, 99, 99, 99}

```
In [ ]: void changeElements(list2)
{
    list[2] = 77;
    list[4] = 88;
    return;
}
```

`list[2]` changed from 99 to 77,

list[4] changed from 99 to 88.

list2[5] = {99, 99, 77, 99, 88};

1. Call function printArray(list2, 5) , where list2 is {99, 99, 77, 99, 88}

```
In [ ]: void printArray(list2, 5)
{
    int i;
    for (i = 0; i < 5; i++)
        printf("%d ", list[i]);
    printf("\n");
    return;
}
```

For i = 0 to 4, print out list2[0] to list2[5]

Then print new line.

Output 3:

99 99 77 99 88

1. Call function copyArray(list2, list1, 5) , where list2 is {99, 99, 77, 99, 88},
list1 is {11, 22, 33, 44, 55}

```
In [ ]: void copyArray(list2, list1, 5)
{
    int i;
    for (i = 0; i < 5; i++)
        list1[i] = list2[i];
    return;
}
```

For i = 0 to 4, copy list1[i] to list2[i]

```
In [ ]: list2[5] = {11, 22, 33, 44, 55};
```

1. Call function printArray(list2, 5) , where list2 is {11, 22, 33, 44, 55}

For i = 0 to 4, print out list2[0] to list2[5]

Then print new line.

Output 4:

11, 22, 33, 44, 55

Final Outputs:

```
In [ ]: 11 22 33 44 55
        11 22 33 44 55
        99 99 77 99 88
        11 22 33 44 55
```