מטלה 10 – מערך מצביעים והקצאה דינמית

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שאלה 1

```
#include <stdio.h>
#define SIZE 10
int main()
{
int phone_num[SIZE] = { 0,5,4,2,8,8,7,1,3,3};
int* p_phone_num[SIZE];
int count = 0;
int* pt = &count;
for (int** p = p_phone_num; p < p_phone_num + SIZE; p++)
{
*p = phone_num + count;
count++;
}
printf("The phone number is");
for (int* pt = phone_num; pt < phone_num + SIZE; pt++)
printf(" %d", *pt);
for (int** p = p_phone_num; p < p_phone_num + SIZE; p++)
{
pt = *p;
printf("\nThe adress are %p the phone number is %d", *p,
*pt);
}
printf("\n");
}
```

```
The phone number is 0 5 4 2 8 8 7 1 3 3
The adress are 0x7ffeefbff450 the phone number is 0
The adress are 0x7ffeefbff454 the phone number is 5
The adress are 0x7ffeefbff458 the phone number is 4
The adress are 0x7ffeefbff45c the phone number is 2
The adress are 0x7ffeefbff460 the phone number is 8
The adress are 0x7ffeefbff464 the phone number is 8
The adress are 0x7ffeefbff468 the phone number is 7
The adress are 0x7ffeefbff46c the phone number is 1
The adress are 0x7ffeefbff470 the phone number is 3
The adress are 0x7ffeefbff474 the phone number is 3
Program ended with exit code: 0
```

שאלה 2

```c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#define SIZE 10
char* NewStr(char* str1, char* str2, int index);
int main()
{
    char str1[SIZE];
    char str2[SIZE];
    char* str3;
    int index;
    printf("Please insert 2 word up to %d letters: \n",
SIZE - 1);
    printf("1.");
    gets(str1);
    printf("2.");
    gets(str2);
    int count1 = strlen(str1), count2 = strlen(str2);
    printf("Please insert a index: ");
    scanf("%d", &index);
    if (index > count1 || index > count2)
    {
        printf("Memory allocation failed");
        return 0;
    }
    str3 = NewStr(str1, str2, index);
    if (str3 == NULL)
        printf("Memory allocation failed\n");
    else
    printf("the new word is : %s", str3);
    free(str3);
    str3 = NULL;

}

char* NewStr(char* str1, char* str2, int index)
{
    int len = index + strlen(str2) - index;
    str1[index] = 0;
    char* str3 = (char*)malloc((len +1)* sizeof(char));
    if (str3 == NULL)
    {
        return str3;
    }
    else
    {
        strcpy(str3,str1);
```

```
        strcat(str3 , str2 + index);
        return str3;
    }
}
```

```
Please insert 2 word up to 9 letters:
1.warning: this program uses gets(), which is unsafe.
abcdefg
2.kpunt
Please insert a index: 2
the new word is : abunt
Program ended with exit code: 0
```

שאלה 3

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#define SIZE 4
char *BiggestLetters(char *strArr[], int size);
int main()
{
char *arr[] = {"hello","and","good","morning"};
char *res = BiggestLetters(arr, SIZE);
if (res == NULL)
{
printf("Memory allocation failed\n");
}
else
{
printf("Biggest letters string is %s\n", res);
}
free(res);
res = NULL;
}

char *BiggestLetters(char *strArr[], int size)
{

char *str = (char*)malloc((size + 1) * sizeof(char));
if (str == NULL)
{
return str;
}
else
{
char max = 'A';
int length;
for (int i = 0; i < size; i++)
{
length = strlen(strArr[i]);
for (int j = 0; j < length; j++)
{
if(*(*(strArr + i) + j) > max)
{
max = *(*(strArr + i) + j);
}
}
str[i] = max;
max = 'A';
}
}
```

```
return str;
}
```

```
Biggest letters string is onor
Program ended with exit code: 0
```

שאלה 4

```c
#define SIZE 3
#include <stdio.h>
#include <stdlib.h>
int *FirstNumberInArray(int *arr[], int size, int
*size1);
int main()
{
    int arr1[] = {1,17,823};
    int arr2[] = {202,77,12};
    int arr3[] = {-15,60,45};
    int *arr[] = {arr1, arr2, arr3};
    int Newsize;
    int* newArr = FirstNumberInArray(arr, SIZE,
&Newsize);
    if (newArr == NULL)
    {
        printf("Memory allocation failed\n");
    }
    printf("The new array is: ");
    for (int i = 0; i < Newsize; i++)
    {
        printf(" %d", newArr[i]);
    }
    printf("\n");
    free(newArr);
    newArr = NULL;
}
int *FirstNumberInArray(int *arr[], int size, int *size1)
{
    int *NewArr = (int *)malloc(size * sizeof(int));
    if (NewArr == NULL)
    {
        return NewArr;
    }
    for (int i = 0; i < size; arr++,i++)
    {
        NewArr[i] = **arr;
    }
    *size1 = size;
    return NewArr;
}
```

```
The new array is:  1 202 -15
Program ended with exit code: 0
```

שאלה 5

```
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#define SIZE 10
#define SIZE2 100
void BreakWord(char str[], char *arr[], int size, int
*newSize);
int countOfDigits(char str[]);
int countOfWords(char str[]);
int main()
{
    int newSize;
    char *str[SIZE];
    char string[SIZE2];
    printf("Please insert a sentence: \n");
    gets(string);
    BreakWord(string, str, SIZE, &newSize);
    if (*str == NULL)
    {
        printf("No Memory\n");
    }
    else
    {
    printf("the new array is: \n");
    for (int i = 0; i < newSize; i++)
    {
        printf("%s ", str[i]);
        free(str[i]);
        str[i] = NULL;
    }
    str[newSize] = NULL;
    printf("\n");
    }
}
void BreakWord(char str[], char *arr[], int size, int
*newSize)
{
    int countDigits;
    *newSize = countOfWords(str);
    for (int i = 0; i < *newSize; i++)
    {
        countDigits = countOfDigits(str);
        *(str + countDigits) = 0;
        arr[i] = (char *)calloc((countDigits + 1),
sizeof(char));
        strcpy(arr[i], (str));
        str = str + countDigits+1;
```

```
    }
}
int countOfDigits(char str[])
{
    int countOfDigitsOfWord = 0;
    for (int i = 0; i < strlen(str); i++)
    {
        if (str[i] != ' ')
        {
            countOfDigitsOfWord++;
        }
        else
        {
            break;
        }
    }
    return countOfDigitsOfWord;
}
int countOfWords(char str[])
{
    int countOfOfWord = 0;
    for (int i = 0; i < strlen(str); i++)
    {
        if (str[i] == ' ')
        {
            countOfOfWord++;
        }
    }
    return (countOfOfWord + 1);
}
```

```
Please insert a sentence:
warning: this program uses gets(), which is unsafe.
hi all good day
the new array is:
hi all good day
Program ended with exit code: 0
```