

Real Time Group

מרכז להכשרות מקצועיות והשמה בתעשיית ההייטק

C Test

Please record your name and answers in English.

Name: _____

Date: _____

1. Please answer to the best of your ability all the questions in the test in English
2. The time for the test in 2 hours.

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Question 1: (___/5)

1. Can you combine the following two statements into one?

```
char *p;  
p = (char*) malloc(100);
```

_____ char *p=(char *) malloc(100); _____

2. what will be the output of the following code ? Is it a compilation error ? If it is, then explain why ?! (___/5)

```
#include <stdio.h>  
int main(){  
    int a = 320;  
    char *ptr;  
    ptr = (char *)&a;  
    printf("%d ", *ptr);  
    return 0;  
}
```

There's no compilation error with the code, there output of the program is:

64.

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Question 2: (___/30)

Write a function which take as an input (unsigned int), and check if the input is a power of 2 without using math.h library.

Hint: think bit-wise.

If the number is power of 2 --> function will print "YES"

if Not --> function will print "NO"

```
void isPowerOf2(UINT num)
{
    int i,count=0,result,shift_num;
    for(i=0;i<NUM_OF_BITS;i++)
    {
        shift_num=num>>i;
        if(shift_num & 1)
            count++;
    }
    if(count==1)
        printf("Yes\n");
    else
        printf("No\n");
}
```

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Question 3: (____/30)

with a given structure, assume that there's a link list with data inside it, as shown bellow:

```
struct test_struct
```

```
{  
    int data;  
    struct test_struct *next;  
};
```

write a function which recieve link list and “val”, look for “val” in the link list if there is such a “val”, delete it, or Not Found Message if it doesn't exist in the list.

Function prototype is:

```
void searchAndDelete(struct test_struct **head,int val);
```

```
void main()
```

```
{  
    ...  
    ...  
    searchAndDelete(&head,val);  
    ...  
    ...  
}
```

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```
void searchAndDelete( struct_test **head, int val)
{
    LIST *currP, *prevP;
    prevP = NULL;
    currP = *head;
    for (currP = *head; currP != NULL; prevP = currP, currP = currP->next)
    {
        if (currP->data == val)
        { /* Found it. */
            if (prevP == NULL)
            {
                /* Fix beginning pointer. */
                *head = currP->next;
            }
            else
            {
                /*
                 * Fix previous node's next to
                 * skip over the removed node.
                 */
                prevP->next = currP->next;
            }
            /* Deallocate the node. */
            free(currP);

            /* Done searching. */
            return;
        }
    }
    printf("Not Found\n");
}
```

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Question 4: (___/10)

We have a memory mapped IO 32 bit register at address 0xffff0000, please implement a function to modify the register as follows:

- Bit 27 should be changed to “1”
- Bit 19 should be changed to “1”
- Bit 8 should be changed to “0”
- Bit 21 should be unmodified
- Bit 7 should be inverted

```
*REG |= (1 << 27);
```

```
*REG |= (1 << 19);
```

```
*REG &= ~(1 << 8);
```

```
*REG ^= (1 << 7);
```

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Question 5: (___/10)

1. Write a macro (using #define) that swaps a and b without usage of any additional variable.

Hint: Think BitWise.

```
#define SWAP(x,y)\
((x = x ^ y) & (y = x ^ y) & (x = x ^ y))
```

2. What is the difference between passing by ref and by val? Point out pluses/minuses of each method.

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Question 6: (_____/20)

what is the error in the given program ? (if there is), fix it and write down the output at the end of the program ?

```
1. #include <stdio.h>
   #include <string.h>
   void func1(char *s)
   {
       int j = strlen(s);
       int k, i;
       for (k = 0; k < j; k++)
       {
           printf("%s", s+k);
           for (i = j - 1; i >= k; i--)
               printf("%c",*(s+i));
           printf("\n");
       }
   }
   int main()
   {
       char *t = "RtG";
       char p; ----> char *p;
       p=t;
       func1(p);
       return 0;
   }
```

Error in compilation, there must be (*) before p in the declaration

the output after fixing the Error Is :

RtGGtR

tGGt

GG

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2. what is the output for the following code ?

```
#include <stdio.h>
int main()
{
    int arr[5] = {10,20,30,40,50};
    int *p[3] = {&arr[0], &arr[1], &arr[2]};
    int **pp;

    pp=p;
    printf("%d\n", **pp);    // output: __10__

    pp++;
    printf("%d\n", **pp);    // output: __20__

    printf("%d\n", ++**pp);  // output: __21__

    return 0;
}
```

3. #define BASE_ADDR 0xffacd1;
unit32 read_reg()
{

return *BASE_ADDR ;
}

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