# Midterm 2 Solutions

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**Instructions**

1. Do all of the 4 problems
2. You have 50 minutes for the exam
3. Show all your work
4. Do not separate midterm papers

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1. (20 pts) What is the output of the following program? Show all your work. Draw the contents of the array.

```c
#include <stdio.h>

int function1(int info[], int size, int a, int b)
{
    if (a>5)
        info[a]=b-1;
    else
        info[a]=b+1;
    return(b+2);
}

int main()
{
    int i,j,info[9];

    info[0]=1;
    for (i=1; i<9; i++)
        info[i]=info[i-1]+3;

    i=9;
    while (i>=0)
    {
        j = function1(info,9, i,(i-1)*(i-1));
        printf("%d %d\n",i,j);
        i = i - 2;
    }
}
```

Solution

```
9 66
7 38
5 18
3 6
1 2
```
2. (30 pts) Write a function `removespaces` to delete all the spaces in a string. Sample executions of the function and the function prototype are given below.

    removespaces(" an apple a day ") returns "anappleaday"
    removespaces("An apple") returns "Anapple"
    removespaces("Apple 2 3 4 5 6") returns "Apple23456"

Complete the function below

Solution

    char *removespaces(char *str)
    {
        char *str1=str;
        char *str2=str;

        while (*str1 != '\0')
        {
            while (*str1 != '\0' && *str1== ' ')
                str1++;
            *str2 = *str1;
            str2++;
            str1++;
        }
        *str2='\0';
        return(str);
    }
3. (20 pts) What is the output of the following program? Show all your work. Draw the contents of the array and pay attention to the formatting of the output.

```c
#include <stdio.h>
#include <stdlib.h>
void print(int *info, int size)
{
    int i;
    for (i=0; i<size; i++)
        printf("%d ",info[i]);
    printf("\n");
    return;
}
int main()
{
    int i,*data,*dataptr;
    data = (int *)malloc(4*sizeof(int));
    for (i=0; i<4; i++)
        data[i]=3*i;
    print(data,4);
    *data = 5;
    dataptr = data;
    dataptr++;
    *dataptr = 1;
    print(data,4);
    *(data+2) = 4;
    *(dataptr+2)=2;
    print(data,4);
    free(data); return 0;
}
```

Solution

0 3 6 9
5 1 6 9
5 1 4 2
4. (30 pts) Write a single function to find the pair of numbers whose sum is the smallest over all the pairs in the array. Add your code to the below function example. Add the additional parameters you need for the pair of numbers. size is the size of array data. You can assume that all the number are distinct.

For the following array

```
2 7 4 3 8 5 6
```

2 and 3 are the pair of numbers that generate the smallest sum 5.

Solution:

```c
void findsmallestpairsum(int *data, int size, int *pair1, int *pair2)
{
    int i,j;
    int minsum = data[0]+data[1];
    for (i=0; i<size; i++)
        for (j=i+1; j<size; j++)
            if (data[i]+data[j] < minsum)
            {
                minsum = data[i]+data[j];
                *pair1 = data[i];
                *pair2 = data[j];
            }
    return;
}
```