CS 1713  
Introduction to Computer Programming II  
Midterm 2 Solutions

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NAME:____________________________________

**Instructions**
1. Do all of the 4 problems
3. You have 50 minutes for the exam
4. Show all your work
5. 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 info[9];
    int i,j;

    info[0]=1;
    for (i=1; i<9; i++)
        info[i]=info[i-1]+2;

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

Solution:

1 2
3 6
5 18
7 38
9 66
2. (30 pts) Write a function `strcut` to truncate a string after n characters. Sample executions of the function and the function prototype are given below. 

\[
\begin{align*}
\text{strcut}("Apple",5) & \text{ returns } "Apple" \\
\text{strcut}("An apple",2) & \text{ returns } "An" \\
\text{strcut}("Apple 2",3) & \text{ returns } "App"
\end{align*}
\]

Complete the function below.

Solution:

```c
char *strcut(char *str, int n) {
    int i=0;
    char *str1 = str;
    for (i=0; i<n; i++)
        str1++;
    *str1='\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 largest 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. Use a SINGLE LOOP (no nested loops) to find the pair of numbers. You can assume that all the array elements are distinct.

For the following array

2 7 4 3 8 5 6

7 and 8 are the pair of numbers that generate the largest sum 15.

Solution:

```c
void findlargestpairsum(int *data, int size, int *pair1, int *pair2)
{
    int i;
    *pair1 = data[0];
    *pair2 = data[0];
    for (i=0; i<size; i++)
    {
        if (data[i]>*pair1)
        {
            *pair2 = *pair1;
            *pair1 = data[i];
        }
        else if (data[i]>*pair2)
        {
            *pair2 = data[i];
        }
    }
}
```