CS143-Introduction to Problem Solving ad Programming

Pointers

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1. Trace the following code:

```
#include <stdio.h>
void main (void )
{
int a=2, b=3;
int *z;
z = &a ;
a = b ;
printf ( " value 1 = %d at address %p \n" , a , &a ) ;
printf ( " value 2 = %d at address %p \n" , b , &b ) ;
printf ( " value 3 = %d at address %p \n" , *z , z) ;
}
```

2. Trace the following code:

```
#include <stdio.h>
void duplicate (int a, int *b, int *c)
{
a=2;
*b=2;
*c=2;
}
void main (void)
{
int x=1, y=3, z=7;
duplicate ( x, &y, &z);
printf ("x=%d \t y=%d \t z=%d \t", x , y , z );
}
```

3. Trace the following code:

```
#include <stdio.h>
void main (void )
{
int a[] = {1, 2, 4, 6, 12, 3, 9};
int *z;
int i;
z = a ;
for( i = 0 ; i < 7; i++ )
{
printf ( " %d\n" , *z ) ;
z++;
}
}
```

4. Trace the following code:

```
#include <stdio.h>
void main (void )
{
float table[] ={ 1.1,2.3,4.5,6.7,8.7,6.6,4.0,3.3,2.7,4.5};
float *pt, *qt;
pt=table;
*pt=0;
qt=pt+2;
*(pt+2)=3.14;
printf(“ %f %f %f %f”, table[0] , table[2], *pt, *qt);
}
```

5. Trace the following code:

```
#include <stdio.h>
void main (void )
{
int a[] = {1, 2, 4, 6, 12};
char c[] = “Hello”;
int *z;
char *x;
int i;
z = a;
x = c;
for( i =0 ; i < 5; i++ )
{
printf ( " %d \t %c\n" , *z, *x ) ;
*z++;
x++;
}
}
```

6. Trace the following code:

```
#include <stdio.h>
int SomeFunction(int *m)
{
*m=(*m)+1;
return(*m);
}
void main (void )
{
int *a,b=1,c=2,d=3,*e;
a=&d;
e=&c;
*a=1;
printf(“%d \t %d \t %d \n”,*e, c, d);
b=someFunction(&c);
printf(“%d \t %d \t %d \n”, d, c, *e);
}
```

7. State the effect of each of the following statements in a subprogram:

```
int x, y, z;
 int *P1, *P2;

P1 = &x;
x = 5;
P2 = P1;
*P2 = *P2 * 3;
z = *P1;  y = z;
printf("%d %d %d", x,y,z);
printf("%d %d", *P1, *P2);
```

8. Find the error(s) in the following program segment:

```
main ( ) {
 char arr [4] = "abc" ;
 char *p; float * fprt, g;
 g = 4.0;
 *fptr = 3;
 g+= *fptr;
 printf(" g = %f \n", g);
 p = arr;
 strcpy(p,"abcde");
 puts(arr);
 }
```

9. In the context of the declaration:

```
float table[10];
float *pt, *qt;
```

What is the effect of the following statements?

a.
```
pt=tables;
*pt=0;
*(pt+2)=3.14
```

b.
```
pt=table+2;
qt=pt
*qt=2.718
```

c.
```
pt=table;
qt=table+10
for(i=0; pt<qt;pt++)
        *pt=i;
```

10. Write a program that contains a function Swap, which gets two integers as parameters (call by reference), then swaps the values of these two numbers.

11. Define a struct named "Point" that represents a point in the 2D space (representing the x and the y position in the X-Y plane).
    a. Write a function that takes a point as a parameter (call by value), and returns its mirror value (Xnew=-x, Ynew=-y). Note: the function should return a struct of type Point.
    b. Write a function that takes a point as a parameter (call by reference), and returns its mirror value (Xnew = -x, Ynew = -y). Note: function type is void.
    c. Write a program to use the above two functions