

(out of 75 points)

1. Consider the program below and found in ic221/hws/03 folder:

```
#include <stdlib.h>
#include <stdio.h>

int main(int argc, char * argv[]){

    int a,b,*p;

    p = &b;
    *p = 15; /* (1) */

    a = b;
    b = 25; /* (2) */

    p = &a; /* (3) */

    (*p)++; /* (4) */

    printf("a:%d\n",a);
    printf("b:%d\n",b);
    printf("*p:%d\n",*p);
}
```

a. Draw the stack diagram at mark (1) and explain briefly:



5/3/2/0

b. Draw the stack diagram at mark (2) and explain briefly:



5/3/2/0

c. Draw the stack diagram at mark (3) and explain briefly:



5/3/2/0

d. Draw the stack diagram at mark (54) and explain briefly:



5/3/2/0

e. What is the output of the program?

5/3/2/0

2. What is the largest **signed short**? Explain.

5/3/2/0

3. Write a format print string to output the number as a percent with only 2 trailing decimals. e.g., "20.05%".

`float perc = 0.2005;`

`printf();`

10/8/3/0

4. Consider the program below and found in ic221/hws/03/prog2
(compile with math library like so: gcc -lm prog2)

10/8/3/0

```
#include <stdlib.h>
#include <stdio.h>
#include <math.h>
#include <ctype.h>
```

```
int main(){
    char s[10];
    double t = 0.0, x;

    while(fscanf(stdin,"%s",s) == 1){
        if (isdigit(s[0]))
            t += sin(atoi(s));
    }

    fprintf(stdout, "%f\n",t);

    return 0;
}
```

a. What does this program do? (hint: use the man page to look up functions you don't know.)

- b. Provide an input that would make this program crash. Why would it crash?

10/8/3/0

5. Why will this program terminate? That is, what condition will make the while loop below will break.

```
#include <stdio.h>
#include <stdlib.h>
#include <ctype.h>

int main(int argc, char * argv){
    char goodbye[100] = "Goodbye cruel world!";
    char *p = goodbye;

    while(*p){
        printf("%c", toupper(*p));
        p++;
    }
}
```

15/8/3/0