CISC105 sections 022-025, Midterm 2 11/21/05

Name_____

Please circle your section number:

022 023 024 025

Answer the multiple choice questions on a “Scantron Form”

Bubble in ONLY your Unix userid and your answers

DO NOT bubble in your id number or section
If you bubble in your SSN, the computer will **reject your form!!!**

Answer the remaining questions directly on the exam paper.

General Instructions

- The exam is 60% multiple choice, 40% programming.
- The programming questions start with number 16. You may want to tackle them first, since they may take more time, and are worth more points (10 points each).
- DO NOT WRITE YOUR NAME ON ANY PAGE EXCEPT THIS ONE!
- You have 50 minutes. **Pace yourself,** and pay attention to the point values.
- Read *all* the directions *carefully* on each problem.
- Good luck.

Questions 1 through 3 deal with the following C program:

```
/* exam question E02_q2.c */
#include <stdio.h>

int main(void)
{
  int b[4] = {0};

  printf("b[0]=%d\n",b[0]);
  printf("b[1]=%d\n",b[1]);
  printf("b[4]=%d\n",b[4]);

  return 0;
}
```

1. (4 pts) Which of the following will be the output of this statement:

   ```
   printf("b[0]=%d\n",b[0]);
   ```

   (a) `b[0]=0`

   (b) `b[0]=1`

   (c) The output cannot be predicted

2. (4 pts) Which of the following will be the output of this statement:

   ```
   printf("b[1]=%d\n",b[1]);
   ```

   (a) `b[1]=0`

   (b) `b[1]=1`

   (c) The output cannot be predicted

3. (4 pts) Which of the following will be the output of this statement:

   ```
   printf("b[4]=%d\n",b[4]);
   ```

   (a) `b[4]=0`

   (b) `b[4]=1`

   (c) `b[4]=4`

   (d) The output cannot be predicted

Questions 4 through 5 deal with the following C program:

```c
/* exam question E02_q1.c */
#include <stdio.h>

int main(void)
{
  int a[] = {17, 76, 10, 66, 14, 92};

  printf("a[1]=%d\n",a[1]);
  printf("a[6]=%d\n",a[6]);

  return 0;
}
```

4. (4 pts) Which of the following will be the output of this statement:

```
printf("a[1]=%d\n",a[1]);
```

   (a) `a[1]=0`
   (b) `a[1]=17`
   (c) `a[1]=76`
   (d) `a[1]=10`
   (e) The output cannot be predicted

5. (4 pts) Which of the following will be the output of this statement:

```
printf("a[6]=%d\n",a[6]);
```

   (a) `a[6]=0`
   (b) `a[6]=6`
   (c) `a[6]=14`
   (d) `a[6]=92`
   (e) The output cannot be predicted

Questions 6 through 7 deal with the following C program:

```
/* exam question E02_q3.c */
#include <stdio.h>

int main(void)
{
  int c[4] = {1};

  printf("c[0]=%d\n",c[0]);
  printf("c[1]=%d\n",c[1]);

  return 0;
}
```

6. (4 pts) Which of the following will be the output of this statement:

```
printf("c[0]=%d\n",c[0]);
```

   (a) `c[0]=0`

   (b) `c[0]=1`

   (c) `c[0]=4`

   (d) The output cannot be predicted

7. (4 pts) Which of the following will be the output of this statement:

```
printf("c[1]=%d\n",c[1]);
```

   (a) `c[1]=0`

   (b) `c[1]=1`

   (c) `c[1]=4`

   (d) The output cannot be predicted

Suppose you have an input file called `data.dat`. Each line in is supposed to contain an integer value. Your task is to read in all of these lines of input and find the sum. The questions must be read in sequence (but you may answer in any order you wish).

8. (4 pts) Read this question carefully: Which of the following *declares a variable* that could be used to access data currently stored in `data.dat`?

   (a) `FILE *input;`

   (b) `FILE *data.dat;`

   (c) `input = fopen("data.dat","r");`

   (d) `input = fopen("data.dat","w");`

   (e) `fgets("data.dat", 80, input);`

9. (4 pts) Which of the following opens the file `data.dat` so that the program can do operations such as `fscanf`?

   (a) `FILE *input;`

   (b) `FILE *data.dat;`

   (c) `input = fopen("data.dat","r");`

   (d) `input = fopen("data.dat","w");`

   (e) `fgets("data.dat", 80, input);`

10. (4 pts) Which of the following evaluates to true when there was a problem opening the file (e.g. `data.dat` doesn't exist)?

    (a) `(input!=NULL)`

    (b) `(input==NULL)`

    (c) `(input==EOF)`

    (d) `(input!=EOF)`

11. (4 pts) Suppose a variable has been declared as `int x;`
    Which of the following reads an integer from the file into this variable?

    (a) `scanf("%d",x);`

    (b) `scanf("%d",&x);`

    (c) `fscanf(input,"%d",x);`

    (d) `fscanf(input,"%d",&x);`

    (e) `fgets(x,40,stdin);`

12. (4 pts) If the variable `x` is of type `int`, which of the following expressions represents the address of that variable?

    (a) `x`

    (b) `*x`

    (c) `&x`

    (d) `addr(x)`

    (e) `addrOf(x)`

13. (4 pts) Which of the following function prototypes represents a function that can modify the contents of the array `data` declared in `main()` as `int data[5];` ?

    (a) `double f(int array[]);`

    (b) `int f(int data);`

    (c) `void f(struct Integer *data);`

    (d) `int f(int *data[]);`

14. (4 pts) Selection sort works in a series of passes over an array. In lecture we demonstrated this by swapping the last element with the largest element in each pass.
    Choose the answer that shows how this array will appear after the **first** pass of selection sort (as demonstrated in class). Assume we are sorting small (left) to large (right).
    original array: [5 2 8 4 1 3 7]

    (a) `1 5 2 8 4 3 7`

    (b) `5 2 3 4 1 7 8`

    (c) `5 8 4 3 7 1 2`

    (d) `5 2 7 4 1 3 8`

Question 15 deals with the following C program:

```
/* Quiz question E02_q5.c */
#include <stdio.h>

void foo(int w);
void fum(int *y);

int main(void)
{
   int a,d;
   a = 3;
   d = 7;
   foo(a);
   fum(&d);
   printf("a=%d d=%d\n",a,d);
   return (0);
}

void foo(int w)
{
   w=2;
   printf("w=%d\n",w);
}

void fum(int *y)
{
   (*y)=5;
   printf("(*y)=%d\n",*y);
}
```

15. (4 pts) Which of the following will be the output of this program?

(a)
```
a=3 d=5
w=2
(*y)=5
```

(b)
```
a=3 d=5
```

(c)
```
w=2
(*y)=5
a=3 d=7
```

(d)
```
w=2
(*y)=5
a=3 d=5
```

(e)
```
w=2
(*y)=5
a=2 d=5
```

Section 4. Programming (answer on this sheet)

16. (10 pts) Fill in the function prototypes in the incomplete C program below. Sample output for the program is also given.

```
/* exam question E02_q4.c */

#include <stdio.h>

/*  function prototypes */

/* @@@ START: FILL IN FUNCTION PROTOTYPES */









/* @@@ END: FILL IN FUNCTION PROTOTYPES */


int main(void)
{
  int a[] = {3, 4, 0, 2, 1};
  int size = 5;

  int b[] = {4, -2, 8, -1};

  int aSum, bSum;

  aSum = sumOfIntegers(a, size);
  bSum = sumOfIntegers(b, 4);

  printf("aSum=%d bSum=%d\n",aSum,bSum);

  makePositive(b,4);
  printArray(b,4);

  return 0;

}
```

```
stimpy[11:20am]> ./E02_q4
aSum=10 bSum=9
{4,2,8,1}
stimpy[11:20am]>
```

17. (10 pts) This question also pertains to the program and sample output shown in Question 16.

Finish the function definition for the function shown below, including the return type, parameter types and names, and any missing code indicated in the function body.

```
/* function definition for sumOfIntegers */

_____________   sumOfIntegers(_____________________________________________)
{
  int sum=0;
  int i;

  /* hint: a for loop that accumulates a sum
     and returns it */

  /* @@@ START: INSERT CODE HERE @@@/









  /* @@@ END: INSERT CODE HERE @@@/
}
```

18. (10 pts) This question also pertains to the program and sample output shown in Question 16.

Finish the function definition for the function shown below, including the return type, parameter types and names, and any missing code indicated in the function body.

```
/* function definition for makePositive */

_____________ makePositive(_____________________________)
{
  /* Hint: an if statement nested in a for loop */

  int sum=0;
  int i;

  /* loop through array; for each element that is
     negative, make it positive */

  /* @@@ START: INSERT CODE HERE @@@/









  /* @@@ END: INSERT CODE HERE @@@/


}
```

19. (10 pts) This question also pertains to the program and sample output shown in Question 16.

Finish the function definition for the function shown below, including the return type, parameter types and names.

Also, fill in the missing code in the for loop header (the rest of the code is already complete!)

```
/* function definition for printArray */

_________   printArray(_________________________)

{
  int i;
  printf("{%d",a[0]); /* print first element without comma after */


  /*  @@@@ JUST FILL IN THE FOR LOOP HEADER @@@@ */


  for (_____________________________________)
    {
      printf(",%d",a[i]);  /* commas before each subsequent element */
    }

  printf("}\n");
}
```

End of Exam. Total Points: 100

2 B R Z Q M T 1 4 A 9 2 P 5 2 1 D 6 I F 3S P E 3 8 C

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Answer Key, version A

1. (a)
2. (a)
3. (d)
4. (c)
5. (e)
6. (b)
7. (a)
8. (a)
9. (c)
10. (b)
11. (d)
12. (c)
13. (a)
14. (d)
15. (d)

Section 4. Programming (answer on this sheet)

16.
```
/* exam question E02_q4.c */

#include <stdio.h>

/* function prototypes */

int sumOfIntegers(int *a, int size); // or int a[]  both could be const
void makePositive(int *a, int size); // or int a[]  only size could be const
void printArray(int *a, int size); // or int a[]    both could be const

int main(void)
{
  int a[] = {3, 4, 0, 2, 1};
  int size = 5;
```

```
  int b[] = {4, -2, 8, -1};

  int aSum, bSum;

  aSum = sumOfIntegers(a, size);
  bSum = sumOfIntegers(b, 4);

  printf("aSum=%d bSum=%d\n",aSum,bSum);

  makePositive(b,4);
  printArray(b,4);

  return 0;

}

/* function definition for sumOfIntegers */

int sumOfIntegers(int *a, int size)
{
  int sum=0;
  int i;

  /* hint: a for loop that accumulates a sum
     and returns it */

  for (i=0; i<size; i++)
    {
      sum += a[i];
    }
  return sum;
}

/* function definition for makePositive */

void makePositive(int *a, int size)
{
  /* Hint: an if statement nested in a for loop */

  int sum=0;
  int i;

  for (i=0; i<size; i++)
    {
      if (a[i] < 0)
        a[i] = a[i] * -1;
    }
}

/* function definition for printArray */
```

```
void printArray(int *a, int size)
{
  int i;
  printf("{%d",a[0]); /* print first element without comma after */

  /* Just fill in the for loop */

  for (i=1; i<size; i++) // @@@ leave off the innards of the for loop
    {
      printf(",%d",a[i]);  /* commas before each subsequent element */
    }

  printf("}\n");
}
```

17. See answer at Question 16.

18. See answer at Question 16.

19. See answer at Question 16.

End of Key, version A
Total Points: 0

CISC105 sections 022-025, Midterm 2 11/21/05

Name_____

Please circle your section number:

022 023 024 025

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- DO NOT WRITE YOUR NAME ON ANY PAGE EXCEPT THIS ONE!
- You have 50 minutes. **Pace yourself,** and pay attention to the point values.
- Read *all* the directions *carefully* on each problem.
- Good luck.

Questions 1 through 2 deal with the following C program:

```c
/* exam question E02_q1.c */
#include <stdio.h>

int main(void)
{
  int a[] = {17, 76, 10, 66, 14, 92};

  printf("a[1]=%d\n",a[1]);
  printf("a[6]=%d\n",a[6]);

  return 0;
}
```

1. (4 pts) Which of the following will be the output of this statement:

   ```
   printf("a[1]=%d\n",a[1]);
   ```

   (a) `a[1]=0`

   (b) `a[1]=17`

   (c) `a[1]=76`

   (d) `a[1]=10`

   (e) The output cannot be predicted

2. (4 pts) Which of the following will be the output of this statement:

   ```
   printf("a[6]=%d\n",a[6]);
   ```

   (a) `a[6]=0`

   (b) `a[6]=6`

   (c) `a[6]=14`

   (d) `a[6]=92`

   (e) The output cannot be predicted

Questions 3 through 5 deal with the following C program:

```
/* exam question E02_q2.c */
#include <stdio.h>

int main(void)
{
  int b[4] = {0};

  printf("b[0]=%d\n",b[0]);
  printf("b[1]=%d\n",b[1]);
  printf("b[4]=%d\n",b[4]);

  return 0;
}
```

3. (4 pts) Which of the following will be the output of this statement:

   ```
   printf("b[0]=%d\n",b[0]);
   ```

   (a) `b[0]=0`

   (b) `b[0]=1`

   (c) The output cannot be predicted

4. (4 pts)Which of the following will be the output of this statement:

   ```
   printf("b[1]=%d\n",b[1]);
   ```

   (a) `b[1]=0`

   (b) `b[1]=1`

   (c) The output cannot be predicted

5. (4 pts) Which of the following will be the output of this statement:

   ```
   printf("b[4]=%d\n",b[4]);
   ```

   (a) `b[4]=0`

   (b) `b[4]=1`

   (c) `b[4]=4`

   (d) The output cannot be predicted

Questions 6 through 7 deal with the following C program:

```
/* exam question E02_q3.c */
#include <stdio.h>

int main(void)
{
  int c[4] = {1};

  printf("c[0]=%d\n",c[0]);
  printf("c[1]=%d\n",c[1]);

  return 0;
}
```

6. (4 pts) Which of the following will be the output of this statement:

```
printf("c[0]=%d\n",c[0]);
```

   (a) `c[0]=0`

   (b) `c[0]=1`

   (c) `c[0]=4`

   (d) The output cannot be predicted

7. (4 pts) Which of the following will be the output of this statement:

```
printf("c[1]=%d\n",c[1]);
```

   (a) `c[1]=0`

   (b) `c[1]=1`

   (c) `c[1]=4`

   (d) The output cannot be predicted

8. (4 pts) If the variable `x` is of type `int`, which of the following expressions represents the address of that variable?

   (a) `x`

   (b) `*x`

   (c) `&x`

   (d) `addr(x)`

   (e) `addrOf(x)`

9. (4 pts) Which of the following function prototypes represents a function that can modify the contents of the array `data` declared in `main()` as `int data[5];` ?

   (a) `double f(int array[]);`

   (b) `int f(int data);`

   (c) `void f(struct Integer *data);`

   (d) `int f(int *data[]);`

10. (4 pts) Selection sort works in a series of passes over an array. In lecture we demonstrated this by swapping the last element with the largest element in each pass.
    Choose the answer that shows how this array will appear after the **first** pass of selection sort (as demonstrated in class). Assume we are sorting small (left) to large (right).
    original array: [5 2 8 4 1 3 7]

    (a) `1 5 2 8 4 3 7`

    (b) `5 2 3 4 1 7 8`

    (c) `5 8 4 3 7 1 2`

    (d) `5 2 7 4 1 3 8`

Suppose you have an input file called `data.dat`. Each line in is supposed to contain an integer value. Your task is to read in all of these lines of input and find the sum. The questions must be read in sequence (but you may answer in any order you wish).

11. (4 pts) Read this question carefully: Which of the following *declares a variable* that could be used to access data currently stored in `data.dat`?

    (a) `FILE *input;`

    (b) `FILE *data.dat;`

    (c) `input = fopen("data.dat","r");`

    (d) `input = fopen("data.dat","w");`

    (e) `fgets("data.dat", 80, input);`

12. (4 pts) Which of the following opens the file `data.dat` so that the program can do operations such as `fscanf`?

    (a) `FILE *input;`

    (b) `FILE *data.dat;`

    (c) `input = fopen("data.dat","r");`

    (d) `input = fopen("data.dat","w");`

    (e) `fgets("data.dat", 80, input);`

13. (4 pts) Which of the following evaluates to true when there was a problem opening the file (e.g. `data.dat` doesn't exist)?

    (a) `(input!=NULL)`

    (b) `(input==NULL)`

    (c) `(input==EOF)`

    (d) `(input!=EOF)`

14. (4 pts) Suppose a variable has been declared as `int x;`
    Which of the following reads an integer from the file into this variable?

    (a) `scanf("%d",x);`

    (b) `scanf("%d",&x);`

    (c) `fscanf(input,"%d",x);`

    (d) `fscanf(input,"%d",&x);`

    (e) `fgets(x,40,stdin);`

Question 15 deals with the following C program:

```
/* Quiz question E02_q5.c */
#include <stdio.h>

void foo(int w);
void fum(int *y);

int main(void)
{
   int a,d;
   a = 3;
   d = 7;
   foo(a);
   fum(&d);
   printf("a=%d d=%d\n",a,d);
   return (0);
}

void foo(int w)
{
   w=2;
   printf("w=%d\n",w);
}

void fum(int *y)
{
   (*y)=5;
   printf("(*y)=%d\n",*y);
}
```

15. (4 pts) Which of the following will be the output of this program?

(a)
```
a=3 d=5
w=2
(*y)=5
```

(b)
```
a=3 d=5
```

(c)
```
w=2
(*y)=5
a=3 d=7
```

(d)
```
w=2
(*y)=5
a=3 d=5
```

(e)
```
w=2
(*y)=5
a=2 d=5
```

Section 4. Programming (answer on this sheet)

16. (10 pts) Fill in the function prototypes in the incomplete C program below. Sample output for the program is also given.

```
/* exam question E02_q4.c */

#include <stdio.h>

/*  function prototypes */

/* @@@ START: FILL IN FUNCTION PROTOTYPES */









/* @@@ END: FILL IN FUNCTION PROTOTYPES */


int main(void)
{
  int a[] = {3, 4, 0, 2, 1};
  int size = 5;

  int b[] = {4, -2, 8, -1};

  int aSum, bSum;

  aSum = sumOfIntegers(a, size);
  bSum = sumOfIntegers(b, 4);

  printf("aSum=%d bSum=%d\n",aSum,bSum);

  makePositive(b,4);
  printArray(b,4);

  return 0;

}
```

```
stimpy[11:20am]> ./E02_q4
aSum=10 bSum=9
{4,2,8,1}
stimpy[11:20am]>
```

17. (10 pts) This question also pertains to the program and sample output shown in Question 16.

Finish the function definition for the function shown below, including the return type, parameter types and names, and any missing code indicated in the function body.

```
/* function definition for sumOfIntegers */

_____________   sumOfIntegers(_____________________________________________)
{
  int sum=0;
  int i;

  /* hint: a for loop that accumulates a sum
     and returns it */

  /* @@@ START: INSERT CODE HERE @@@/









  /* @@@ END: INSERT CODE HERE @@@/
}
```

18. (10 pts) This question also pertains to the program and sample output shown in Question 16.

Finish the function definition for the function shown below, including the return type, parameter types and names, and any missing code indicated in the function body.

```
/* function definition for makePositive */

_____________ makePositive(_____________________________)
{
  /* Hint: an if statement nested in a for loop */

  int sum=0;
  int i;

  /* loop through array; for each element that is
     negative, make it positive */

  /* @@@ START: INSERT CODE HERE @@@/









  /* @@@ END: INSERT CODE HERE @@@/


}
```

19. (10 pts) This question also pertains to the program and sample output shown in Question 16.

Finish the function definition for the function shown below, including the return type, parameter types and names.

Also, fill in the missing code in the for loop header (the rest of the code is already complete!)

```
/* function definition for printArray */

_________   printArray(_________________________)

{
  int i;
  printf("{%d",a[0]); /* print first element without comma after */


  /*  @@@@ JUST FILL IN THE FOR LOOP HEADER @@@@ */


  for (_____________________________________)
    {
      printf(",%d",a[i]);  /* commas before each subsequent element */
    }

  printf("}\n");
}
```

End of Exam. Total Points: 100

2 B R Z Q M H 1 4 B 9 2 P 5 2 1 D 6 S F 3T P E 3 8 C

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Answer Key, version B

1. (c)
2. (e)
3. (a)
4. (a)
5. (d)
6. (b)
7. (a)
8. (c)
9. (a)
10. (d)
11. (a)
12. (c)
13. (b)
14. (d)
15. (d)

Section 4. Programming (answer on this sheet)

16.
```
/* exam question E02_q4.c */

#include <stdio.h>

/* function prototypes */

int sumOfIntegers(int *a, int size); // or int a[]  both could be const
void makePositive(int *a, int size); // or int a[]  only size could be const
void printArray(int *a, int size); // or int a[]    both could be const

int main(void)
{
  int a[] = {3, 4, 0, 2, 1};
  int size = 5;
```

```
  int b[] = {4, -2, 8, -1};

  int aSum, bSum;

  aSum = sumOfIntegers(a, size);
  bSum = sumOfIntegers(b, 4);

  printf("aSum=%d bSum=%d\n",aSum,bSum);

  makePositive(b,4);
  printArray(b,4);

  return 0;

}

/* function definition for sumOfIntegers */

int sumOfIntegers(int *a, int size)
{
  int sum=0;
  int i;

  /* hint: a for loop that accumulates a sum
     and returns it */

  for (i=0; i<size; i++)
    {
      sum += a[i];
    }
  return sum;
}

/* function definition for makePositive */

void makePositive(int *a, int size)
{
  /* Hint: an if statement nested in a for loop */

  int sum=0;
  int i;

  for (i=0; i<size; i++)
    {
      if (a[i] < 0)
        a[i] = a[i] * -1;
    }
}

/* function definition for printArray */
```

```
void printArray(int *a, int size)
{
  int i;
  printf("{%d",a[0]); /* print first element without comma after */

  /* Just fill in the for loop */

  for (i=1; i<size; i++) // @@@ leave off the innards of the for loop
    {
      printf(",%d",a[i]);  /* commas before each subsequent element */
    }

  printf("}\n");
}
```

17. See answer at Question 16.

18. See answer at Question 16.

19. See answer at Question 16.

End of Key, version B
Total Points: 0

CISC105 sections 022-025, Midterm 2 11/21/05

Name_____

Please circle your section number:

022 023 024 025

Answer the multiple choice questions on a “Scantron Form”

Bubble in ONLY your Unix userid and your answers

DO NOT bubble in your id number or section
If you bubble in your SSN, the computer will **reject your form!!!**

Answer the remaining questions directly on the exam paper.

General Instructions

- The exam is 60% multiple choice, 40% programming.
- The programming questions start with number 16. You may want to tackle them first, since they may take more time, and are worth more points (10 points each).
- DO NOT WRITE YOUR NAME ON ANY PAGE EXCEPT THIS ONE!
- You have 50 minutes. **Pace yourself,** and pay attention to the point values.
- Read *all* the directions *carefully* on each problem.
- Good luck.

Questions 1 through 2 deal with the following C program:

```
/* exam question E02_q3.c */
#include <stdio.h>

int main(void)
{
  int c[4] = {1};

  printf("c[0]=%d\n",c[0]);
  printf("c[1]=%d\n",c[1]);

  return 0;
}
```

1. (4 pts) Which of the following will be the output of this statement:

   ```
   printf("c[0]=%d\n",c[0]);
   ```

   (a) `c[0]=0`

   (b) `c[0]=1`

   (c) `c[0]=4`

   (d) The output cannot be predicted

2. (4 pts) Which of the following will be the output of this statement:

   ```
   printf("c[1]=%d\n",c[1]);
   ```

   (a) `c[1]=0`

   (b) `c[1]=1`

   (c) `c[1]=4`

   (d) The output cannot be predicted

Questions 3 through 5 deal with the following C program:

```
/* exam question E02_q2.c */
#include <stdio.h>

int main(void)
{
  int b[4] = {0};

  printf("b[0]=%d\n",b[0]);
  printf("b[1]=%d\n",b[1]);
  printf("b[4]=%d\n",b[4]);

  return 0;
}
```

3. (4 pts) Which of the following will be the output of this statement:

   ```
   printf("b[0]=%d\n",b[0]);
   ```

   (a) `b[0]=0`

   (b) `b[0]=1`

   (c) The output cannot be predicted

4. (4 pts)Which of the following will be the output of this statement:

   ```
   printf("b[1]=%d\n",b[1]);
   ```

   (a) `b[1]=0`

   (b) `b[1]=1`

   (c) The output cannot be predicted

5. (4 pts) Which of the following will be the output of this statement:

   ```
   printf("b[4]=%d\n",b[4]);
   ```

   (a) `b[4]=0`

   (b) `b[4]=1`

   (c) `b[4]=4`

   (d) The output cannot be predicted

Questions 6 through 7 deal with the following C program:

```
/* exam question E02_q1.c */
#include <stdio.h>

int main(void)
{
  int a[] = {17, 76, 10, 66, 14, 92};

  printf("a[1]=%d\n",a[1]);
  printf("a[6]=%d\n",a[6]);

  return 0;
}
```

6. (4 pts) Which of the following will be the output of this statement:

```
printf("a[1]=%d\n",a[1]);
```

   (a) `a[1]=0`
   (b) `a[1]=17`
   (c) `a[1]=76`
   (d) `a[1]=10`
   (e) The output cannot be predicted

7. (4 pts) Which of the following will be the output of this statement:

```
printf("a[6]=%d\n",a[6]);
```

   (a) `a[6]=0`
   (b) `a[6]=6`
   (c) `a[6]=14`
   (d) `a[6]=92`
   (e) The output cannot be predicted

Suppose you have an input file called `data.dat`. Each line in is supposed to contain an integer value. Your task is to read in all of these lines of input and find the sum. The questions must be read in sequence (but you may answer in any order you wish).

8. (4 pts) Read this question carefully: Which of the following *declares a variable* that could be used to access data currently stored in `data.dat`?

   (a) `FILE *input;`

   (b) `FILE *data.dat;`

   (c) `input = fopen("data.dat","r");`

   (d) `input = fopen("data.dat","w");`

   (e) `fgets("data.dat", 80, input);`

9. (4 pts) Which of the following opens the file `data.dat` so that the program can do operations such as `fscanf`?

   (a) `FILE *input;`

   (b) `FILE *data.dat;`

   (c) `input = fopen("data.dat","r");`

   (d) `input = fopen("data.dat","w");`

   (e) `fgets("data.dat", 80, input);`

10. (4 pts) Which of the following evaluates to true when there was a problem opening the file (e.g. `data.dat` doesn't exist)?

    (a) `(input!=NULL)`

    (b) `(input==NULL)`

    (c) `(input==EOF)`

    (d) `(input!=EOF)`

11. (4 pts) Suppose a variable has been declared as `int x;`
    Which of the following reads an integer from the file into this variable?

    (a) `scanf("%d",x);`

    (b) `scanf("%d",&x);`

    (c) `fscanf(input,"%d",x);`

    (d) `fscanf(input,"%d",&x);`

    (e) `fgets(x,40,stdin);`

12. (4 pts) If the variable `x` is of type `int`, which of the following expressions represents the address of that variable?

    (a) `x`

    (b) `*x`

    (c) `&x`

    (d) `addr(x)`

    (e) `addrOf(x)`

13. (4 pts) Which of the following function prototypes represents a function that can modify the contents of the array `data` declared in `main()` as `int data[5];` ?

    (a) `double f(int array[]);`

    (b) `int f(int data);`

    (c) `void f(struct Integer *data);`

    (d) `int f(int *data[]);`

14. (4 pts) Selection sort works in a series of passes over an array. In lecture we demonstrated this by swapping the last element with the largest element in each pass.
    Choose the answer that shows how this array will appear after the **first** pass of selection sort (as demonstrated in class). Assume we are sorting small (left) to large (right).
    original array: [5 2 8 4 1 3 7]

    (a) `1 5 2 8 4 3 7`

    (b) `5 2 3 4 1 7 8`

    (c) `5 8 4 3 7 1 2`

    (d) `5 2 7 4 1 3 8`

Question 15 deals with the following C program:

```
/* Quiz question E02_q5.c */
#include <stdio.h>

void foo(int w);
void fum(int *y);

int main(void)
{
   int a,d;
   a = 3;
   d = 7;
   foo(a);
   fum(&d);
   printf("a=%d d=%d\n",a,d);
   return (0);
}

void foo(int w)
{
   w=2;
   printf("w=%d\n",w);
}

void fum(int *y)
{
   (*y)=5;
   printf("(*y)=%d\n",*y);
}
```

15. (4 pts) Which of the following will be the output of this program?

(a)
```
a=3 d=5
w=2
(*y)=5
```

(b)
```
a=3 d=5
```

(c)
```
w=2
(*y)=5
a=3 d=7
```

(d)
```
w=2
(*y)=5
a=3 d=5
```

(e)
```
w=2
(*y)=5
a=2 d=5
```

Section 4. Programming (answer on this sheet)

16. (10 pts) Fill in the function prototypes in the incomplete C program below. Sample output for the program is also given.

```
/* exam question E02_q4.c */

#include <stdio.h>

/*  function prototypes */

/* @@@ START: FILL IN FUNCTION PROTOTYPES */









/* @@@ END: FILL IN FUNCTION PROTOTYPES */


int main(void)
{
  int a[] = {3, 4, 0, 2, 1};
  int size = 5;

  int b[] = {4, -2, 8, -1};

  int aSum, bSum;

  aSum = sumOfIntegers(a, size);
  bSum = sumOfIntegers(b, 4);

  printf("aSum=%d bSum=%d\n",aSum,bSum);

  makePositive(b,4);
  printArray(b,4);

  return 0;

}
```

```
stimpy[11:20am]> ./E02_q4
aSum=10 bSum=9
{4,2,8,1}
stimpy[11:20am]>
```

17. (10 pts) This question also pertains to the program and sample output shown in Question 16.

Finish the function definition for the function shown below, including the return type, parameter types and names, and any missing code indicated in the function body.

```
/* function definition for sumOfIntegers */

_____________   sumOfIntegers(_____________________________________________)
{
  int sum=0;
  int i;

  /* hint: a for loop that accumulates a sum
     and returns it */

  /* @@@ START: INSERT CODE HERE @@@/









  /* @@@ END: INSERT CODE HERE @@@/
}
```

18. (10 pts) This question also pertains to the program and sample output shown in Question 16.

Finish the function definition for the function shown below, including the return type, parameter types and names, and any missing code indicated in the function body.

```
/* function definition for makePositive */

_____________ makePositive(_____________________________)
{
  /* Hint: an if statement nested in a for loop */

  int sum=0;
  int i;

  /* loop through array; for each element that is
     negative, make it positive */

  /* @@@ START: INSERT CODE HERE @@@/









  /* @@@ END: INSERT CODE HERE @@@/


}
```

19. (10 pts) This question also pertains to the program and sample output shown in Question 16.

Finish the function definition for the function shown below, including the return type, parameter types and names.

Also, fill in the missing code in the for loop header (the rest of the code is already complete!)

```
/* function definition for printArray */

_________   printArray(_________________________)

{
  int i;
  printf("{%d",a[0]); /* print first element without comma after */


  /*  @@@@ JUST FILL IN THE FOR LOOP HEADER @@@@ */


  for (_____________________________________)
    {
      printf(",%d",a[i]);  /* commas before each subsequent element */
    }

  printf("}\n");
}
```

End of Exam. Total Points: 100

2 B R Z Q M T 1 4 C 9 2 P 5 2 1 D 6 J F 3N P E 3 8 A

CISC105 sections 022-025, Midterm 1 10/10/05

Answer Key, version C

1. (b)
2. (a)
3. (a)
4. (a)
5. (d)
6. (c)
7. (e)
8. (a)
9. (c)
10. (b)
11. (d)
12. (c)
13. (a)
14. (d)
15. (d)

Section 4. Programming (answer on this sheet)

16.
```
/* exam question E02_q4.c */

#include <stdio.h>

/* function prototypes */

int sumOfIntegers(int *a, int size); // or int a[]  both could be const
void makePositive(int *a, int size); // or int a[]  only size could be const
void printArray(int *a, int size); // or int a[]    both could be const

int main(void)
{
  int a[] = {3, 4, 0, 2, 1};
  int size = 5;
```

```
  int b[] = {4, -2, 8, -1};

  int aSum, bSum;

  aSum = sumOfIntegers(a, size);
  bSum = sumOfIntegers(b, 4);

  printf("aSum=%d bSum=%d\n",aSum,bSum);

  makePositive(b,4);
  printArray(b,4);

  return 0;

}

/* function definition for sumOfIntegers */

int sumOfIntegers(int *a, int size)
{
  int sum=0;
  int i;

  /* hint: a for loop that accumulates a sum
     and returns it */

  for (i=0; i<size; i++)
    {
      sum += a[i];
    }
  return sum;
}

/* function definition for makePositive */

void makePositive(int *a, int size)
{
  /* Hint: an if statement nested in a for loop */

  int sum=0;
  int i;

  for (i=0; i<size; i++)
    {
      if (a[i] < 0)
        a[i] = a[i] * -1;
    }
}

/* function definition for printArray */
```

```
void printArray(int *a, int size)
{
  int i;
  printf("{%d",a[0]); /* print first element without comma after */

  /* Just fill in the for loop */

  for (i=1; i<size; i++) // @@@ leave off the innards of the for loop
    {
      printf(",%d",a[i]);  /* commas before each subsequent element */
    }

  printf("}\n");
}
```

17. See answer at Question 16.

18. See answer at Question 16.

19. See answer at Question 16.

End of Key, version C
Total Points: 0