SUBJECT I.D. # 5125

Study on Code Comprehension

Date: _____

DIRECTIONS:

Thank you for agreeing to participate in this study. Please read these instructions carefully.

You will be asked to look at four examples of source code taken from different small computer programs. For each sample, step through the program as if you were the computer, executing each instruction. Following each code sample, you will find a page divided into two columns. The left hand side is to be used as "scratch paper," for notes or for working through the code. In the right hand column, labeled "Program Output," please record the standard output of the program, emitted by the *printf* function.

Please try to trace each program until it terminates. If, for whatever reason, you feel you have to give up on a question, please make a note in the program output by writing "I give up!". If you fill every line of space given to you in the Program Output section you should stop working on that question and move to the next.

Lastly, please note the time you start and finish your work on each program in the given spaces.

After the test, you will find a short questionnaire about you and your programming experience. Please complete this as well.

Example of a Completed Response

Start Time: 9:32 a.m.

Program Code

```
void main() {
  int V1 = 21;
  printf("a: %d\n", V1);
  V1 *= 2;
  printf("b: %d\n", V1);
}
```

Program Output

a: 21

b: 42

Finish Time: 9:49 a.m.

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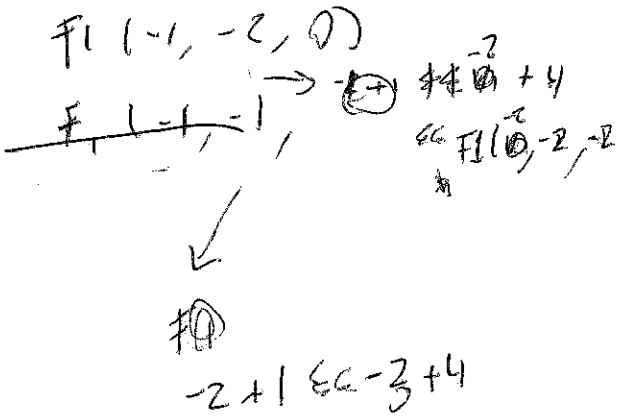
Program Code Sample E

```
#include <stdio.h>
double V4;
int V5;

int F1(int V1, int V2, int V3) {
  printf("a: %d %d %d %f\n", V1, V2, V3, V4);
  return printf(
    "b: %c\n",
      (V1 - 1 && V1 + 4 && F1(V1, -1, V1), V1 && V2)
        ((F1(-1, ++V2, V3),
          (V5 = (int)(V4 = (int)(V2 + 1) /
                           (1 - (int)V3 * 2 - (int)V3 * (int)V3),
                       V4 * V4 >= 1 && ((2 % 3) / 4 - 2 + (V4 / 2)) < 1),
          printf("c: %d %d %d %f %d\n", V1, V2, V3, V4, V5, V5)["ab"]))
        : 'c');
}

int main() {
  F1(-1, -2, 0);
  printf("d\n");
}
```

Program E Notes



Program E Output

Start Time: 14:06

a: -1 -2 0 0.0

a: 2 -2 -2 0.0

b: c

d

End Time: 14:17

Program Code Sample D

```
#include <stdio.h>

void F1(int V1, int V2, int V3, int V4)
  V1 = V1 + 1;
  V2 = V1;
  while (V2 < 4)
    V3 = 0;

    printf("a: %d %d %d %d\n", V1, V2, V3, V4);
    int V9;
    if (V3 < V2) {
      V3 = (V3 * 8) + (V2 % 8);
      V2 /= 8;
      V4 = (V3 == V2) | ((V3 / 8) == V2);
      V9 = 1;
    } else {
      V4 = V4 + 1;
      if ((V1 - V4) != 0) {
        V9 = V1 % V4;
      } else {
        printf("b: %d\n", V1);
        V9 = 2 && (V1 % V4);
      }
    }
    for (; V9;)
    printf("c: %d %d %d %d\n", V1, V2, V3, V4);
    if (V3 < V2) {
      V3 = (V3 * 8) + (V2 % 8);
      V2 /= 8;
      V4 = (V3 == V2) | ((V3 / 8) == V2);
      V9 = 1;
    } else {
      V4 = V4 + 1;
      if ((V1 - V4) != 0) {
        V9 = V1 % V4;
      } else {
        printf("d: %d\n", V1);
        V9 = 2 && (V1 % V4);
      }
    }
}
```

```
    V1 = V1 + 1;
    V2 = V1;
}
int main() {
  F1(1, 0, 0, 0);
  printf("e\n");
}
```

Program D Notes

F1 =

Program D Output

Start Time: 14:17

e: 2 2 0 0

~~c: 2 0 0 0 0~~

~~e: 3 3 0 0 e 2 0 0 2~~

c: 2 0 0 1 ~~e: 3 3 0 2~~

e: 3 3 0 1

c: 3 3 0 1

d: 4

End Time: 14:36

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Program Code Sample G

```
#include <stdio.h>

int F1(int V1, int V2) {
  int V3, V4;

  printf("a: %d %d\n", V1, V2);

  for (V3 = V4 = 1; V3* V3 <= V1 ? V4 = V1 % V3 ? V4 : V3 : V2 + 1
                    ? V4 < 2 ? V1 && F1(V2, 0) : F1(V4, V2),
      printf("b: %d\n", V2 ? 10 : 32 << !V1),
      V1 -= V4 * !!V1 : (F1(V4, V1 / V4), 0);) {
    printf("c: %d %d\n", V1, V4);
    V3++;
  }

  return 0;
}

int main() {
  F1(1, 0);
  printf("d\n");
}
```

Program G Notes

F1, 11, 0)

1 0 1 1

) 0 1 0

1 0 2 0

0 0 1 1

0 0

Program G Output

Start Time: 14:37

a: 1 0

b: 32

c: 1 0

a: 0 0

c: 0 1

d

End Time: 14:49

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Program Code Sample B

```
#include <stdio.h>
void F1(int V1, char *V2, int V3) {
  printf("a: %d %s %d\n", V1, V2, V3);
  int V4 = (V1 / V3) + V3;
  char *V5 = V2 - V1;
  V2 = V2 - 1;
  int V6 = (int)V2 / (int)V2;
  printf("b: %d %s %d\n", V4, V5, V6);
}
int V7;
int main() {
  for (; "ab"[V7] != 0;) {
    F1(97 - 97, V7 + "zy", 122 / 122);
    V7 = V7 + 1;
  }
  printf("c\n");
}
```

Program B Notes

F1(0, "zy", 1)

F1(0, "y", 1

Program B Output

Start Time: 14:50.

a: 0 zy 1

b: 1 zy 1

a: 0 y 1

b: 0 y 1

c.

End Time: 14:54