

**National University of Singapore**  
**School of Computing**  
**MID-SEMESTER TEST FOR Semester 2 AY2011/2012**

CS1010E — Programming Methodology

03 March 2012      Time Allowed: 60 Minutes

INSTRUCTIONS TO CANDIDATES

1. This test paper contains TWENTY (20) questions and comprises NINE (9) printed pages, including this page.
2. Every questions is worth one mark.  
The maximum possible mark is 20.
3. Answer ALL questions by shading the letter corresponding to the most appropriate answer on the OCR form provided.
4. This is an OPEN BOOK test.
5. Do not look at the questions until you are told to do so.
6. There is no negative marking, so please attempt every question.
7. You may keep the question paper after the test is over.

For all the questions, assume that the relevant `#include` pre-processor statements have been included in the program where necessary. Choose the most appropriate answer for each question.

1. Which of the following are NOT valid C identifiers?

1 `cs1010e`  
2 `1010e`  
3 `cs_1010e`  
4 `cs-1010e`  
5 `_cs1010e`

- A. 3, 5  
B. 3, 4, 5  
**C. 2, 3**  
D. 2, 4  
E. 2, 4, 5

2. Consider the following program segment.  
What will be the final value of `x`?

```
int x;  
x = 4 + 6 / 3 * 2 - 2;
```

- A. 3  
B. 4  
C. 5  
**D. 6**  
E. A compilation error occurs

3. What is printed out by the following code fragment?

```
double x = 9/10;  
printf("%f\n", x);
```

- A. 0.000000  
B. 0.900000  
C. 1.000000  
**D. System dependent**  
E. None of the above

4. Consider the following program segment.  
What will be the final value of x?

```
double x=1.00, y=2, z=4;
if (y / z || ++x)
    x += y / z;
```

- A. 1.0
  - B. 1.5**
  - C. 2.0
  - D. 2.5
  - E. None of the above
5. What is equivalent code for the assignment shown below?  
Assume that all variables are integer variables.

```
x = i || j;
```

- A. `if (i) if (j) x = 1; else x = 0; else x = 0;`
  - B. `if (!i) if (!j) x = 0; else x = 1; else x = 0;`
  - C. `if (!i) if (!j) x = 0; else x = 1; else x = 1;`**
  - D. `if (!i) if (!j) x = 1; else x = 0; else x = 1;`
  - E. None of the above
6. Suppose i and j are integer variables.  
Given the following code fragment, what are the values of i which will cause something to be printed?

```
if (++i) printf("Hello World\n");
```

- A.  $i = 0$
- B.  $i = -1$
- C.  $i \neq 0$
- D.  $i \neq -1$**
- E. None of the above

7. Suppose  $i$  and  $j$  are integer variables.

Given the following code fragment, what are the values of  $i$  which will NOT cause something to be printed?

```
if (isdigit('6' - i)) printf("Hello World\n");
```

- A.  $i = 0$
  - B.  $-1 \leq i \leq 3$
  - C.  $-2 \leq i \leq 2$
  - D.  $-3 \leq i \leq 1$
  - E.** None of the above
8. What is printed out by the following C code fragment?

```
int x = 15, y = 10;
if (x < y)
    if (y > 5) y++;
else
    y += 2; x += 2;
printf("%d %d\n", x, y);
```

- A. 15 11
  - B.** 17 12
  - C. 17 10
  - D. 17 13
  - E. A compilation error occurs
9. What is printed out by the following C code fragment?

```
int a = 1, s = 0, i;
switch (a) {
    case 1:
    case 2: s++;
    case 3: for (i = 0; i < a; i++) { ++s; break; }
    case 4: ++s; break;
}
printf("%i\n", s);
```

- A.** 3
- B. 2
- C. 1
- D. 0
- E. None of the above

10. What is printed out by the following C program fragment?

```
int i = 18, j = 1;
switch (i/15) {
    case 0: j += 5;
    case 1: j *= 4;
    case 2: j /= 3;
    default: j -= 2;
}
printf("%i\n", j);
```

- A. -2
- B. -1**
- C. 1
- D. 4
- E. A compilation error will occur.

11. Consider the following program segment:

```
int i = 6720, j = 4;
while ((i % j) == 0) {
    i = i / j;
    j = j + 1;
}
```

What will be the value of j on termination of the segment?

- A. 4
- B. 8
- C. 9**
- D. 6270
- E. A run-time error occurs

12. What is the output of the following code segment?

```
int x = 0, i = 0, z;
for(z = 4; i < 5; i += 2)
    x += ++z;
printf("%d\n", x);
```

- A. 18**
- B. 15
- C. 22
- D. 27
- E. A compilation error occurs.

13. What will be printed out by the following C code fragment?

```
int i, j = 0;
for (i = 1; i <= 8; i++) {
    if (!(i % 3)) continue;
    j++;
}
printf("%i %i\n", i, j);
```

- A. 8 8
- B. 8 7
- C. 8 6
- D. 9 7
- E. 9 6**

14. What is printed out by the following code fragment?

```
int i, j, k = 0;
for (i = 16; i > 0; i/=2)
    for (j = i; j > 0; j/=2) k++;
printf("%i\n", k);
```

- A. 12
- B. 15**
- C. 18
- D. 21
- E. None of the above

15. What is the output of the following program?

```
void max(int, int, int);

int main(void) {
    int i, j, k;
    i = 20; j = 5; k = 0;
    max(i, j, k);
    printf("%d\n", k);
}

void max(int x, int y, int m) {
    if (x > y) m = x;
    else m = y;
}
```

- A. 5
- B. 20
- C. 0**
- D. A runtime error occurs
- E. None of the above

16. What is the output of the following program?

```
void min(int, int);
int k = 0;

int main(void) {
    int i, j;
    i = 20; j = 5;
    min(i, j);
    printf("%d\n", k);
}

void min(int x, int y) {
    if (x < y) k = x; else k = y;
}
```

- A. 5**
- B. 20
- C. 0
- D. A runtime error occurs
- E. None of the above

17. What is output by the following program?

```
int newval(int);

int main() {
    int x = 0;
    x += newval(x++);
    printf("%d\n", x);
    return 0;
}

int newval(int x) {
    return x++ + 1;
}
```

- A. 1
- B. 2**
- C. 3
- D. 4
- E. A compilation error will occur

18. What is the output of the following program?

```
int f(int);
int g(int);

int main(void) {
    printf("%d\n", f(1)+g(1));
}

int f(int x) {
    return g(2*x);
}

int g(int x) {
    return 3*x;
}
```

- A. 6
- B. 7
- C. 8
- D. 9**
- E. None of the above

19. [2 marks] What is the output of the following program?

```
int ff(int);
int gg(int);

int main(void) {
    printf("%d\n", ff(4));
}

int ff(int x) {
    if (x) return (2 + gg(x-1));
    else return 0;
}

int gg(int x) {
    if (x) return (3 + ff(x-1));
    else return 0;
}
```



- A. 9
- B. 10**
- C. 11
- D. 12
- E. None of the above

20. [2 marks] What is printed out by the following program?

```
int ffff(int);

int main(void) {
    printf("%d\n", ffff(4));
}

int ffff(int x) {
    static int y = 0;
    if (x > 0) return ++y + ffff(x - 1);
    else return 0;
}
```

- A. 4
- B. 6
- C. 8
- D. 10**
- E. None of the above

**END of PAPER**