CISC 181 sections 010-012, Midterm 2 11/11/05

Name_____

Please circle your section number:

010 (Wed PM)

011 (Mon PM)

012 (Mon AM)

Answer the multiple choice questions on a “Scantron Form”

Bubble in ONLY your Unix userid and your answers

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- Good luck.

The following questions deal with this code excerpt:

```
// quiz question
#include <iostream>
using namespace std;

struct Point_S
{
  int x;
  int y;
};

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



{
   int  a;
   int *b;
   int *c;

   double  d;
   double  e;
   double *f;
   double *g;

   Point_S *p;
   Point_S *q;
   Point_S *r;
   Point_S  s;
   Point_S  t;

   b = new int;
   c = &a;

   f = new double;
   g = &e;

   p = new Point_S;
   q = new Point_S;
   r = &s;

   cout << "Hi" << endl;
   return 0;
}
```

1. (40 pts) Suppose you run the C++ program on the previous page, and the program reaches the line of code that prints out `Hi`.

   Indicate whether, at that point in time, the expression given in the table on the left

   - refers to a memory location on the *stack*,
   - refers to a memory location on the *heap*,
   - would cause an *error* (e.g. dereferencing something that isn't a pointer.)

   Then, in the table on the right, fill in the type of each expression, or write "error" if the expression would not be valid (e.g. dereferencing something that isn't a pointer, or using the dot operator (`.`) on something that isn't a `struct`.

expression	*Circle stack, heap or error*
a	stack heap error
*a	stack heap error
b	stack heap error
*b	stack heap error
c	stack heap error
*c	stack heap error
*d	stack heap error
*e	stack heap error
f	stack heap error
*f	stack heap error
g	stack heap error
*g	stack heap error
p	stack heap error
*p	stack heap error
*q	stack heap error
*r	stack heap error
*s	stack heap error
*t	stack heap error

expression	*type*
a	int
*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

End of Exam. Total Points: 40

XY A F R A 9 1 B D P E 3 8 A 8 2 D 6 D F 3S

A KEY CISC 181 sections 010-012, Midterm 2 11/11/05

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using namespace std;

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};

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



{
   int  a;
   int *b;
   int *c;

   double  d;
   double  e;
   double *f;
   double *g;

   Point_S *p;
   Point_S *q;
   Point_S *r;
   Point_S  s;
   Point_S  t;

   b = new int;
   c = &a;

   f = new double;
   g = &e;

   p = new Point_S;
   q = new Point_S;
   r = &s;

   cout << "Hi" << endl;
   return 0;
}
```

1. (40 pts) Suppose you run the C++ program on the previous page, and the program reaches the line of code that prints out `Hi`.

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expression	*Circle stack, heap or error*
a	stack heap error
*a	stack heap error
b	stack heap error
*b	stack heap error
c	stack heap error
*c	stack heap error
*d	stack heap error
*e	stack heap error
f	stack heap error
*f	stack heap error
g	stack heap error
*g	stack heap error
p	stack heap error
*p	stack heap error
*q	stack heap error
*r	stack heap error
*s	stack heap error
*t	stack heap error

expression	*type*
a	int
*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

expression	*Answer*		
a	stack		
*a			error
b	stack		
*b		heap	
c	stack		
*c	stack		
*d			error
*e			error
f	stack		
*f		heap	
g	stack		
*g	stack		
p	stack		
*p		heap	
*q		heap	
*r	stack		
*s			error
*t			error

expression	*type*
a	int
*a	error
&a	int *
b	int*
*b	int
&b	int**
d	double
*d	error
e	double
&e	double *
p	Point_S *
*r	Point_S
&s	Point_S *
t->x	error
q.y	error
q->y	int
(*p).x	int
&(p.x)	error
argc	int
argv[0]	char *
argv[0][1]	char
argv	char **
&argc	int *

End of Key, seed 3456 version A
Total Points: 40

CISC 181 sections 010-012, Midterm 2 11/11/05

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using namespace std;

struct Point_S
{
  int x;
  int y;
};

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



{
   int *a;
   int *b;
   int  c;

   double  d;
   double *e;
   double *f;
   double  g;

   Point_S  p;
   Point_S *q;
   Point_S *r;
   Point_S *s;
   Point_S  t;

   a = new int;
   b=&c;

   e = new double;
   f = &d;

   q = new Point_S;
   r = &p ;
   s = &t;

   cout << "Hi" << endl;
   return 0;
}
```

1. (40 pts) Suppose you run the C++ program on the previous page, and the program reaches the line of code that prints out `Hi`.

   Indicate whether, at that point in time, the expression given in the table on the left

   - refers to a memory location on the *stack*,
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expression	*Circle stack, heap or error*
a	stack heap error
*a	stack heap error
b	stack heap error
*b	stack heap error
c	stack heap error
*c	stack heap error
*d	stack heap error
*e	stack heap error
f	stack heap error
*f	stack heap error
g	stack heap error
*g	stack heap error
p	stack heap error
*p	stack heap error
*q	stack heap error
*r	stack heap error
*s	stack heap error
*t	stack heap error

expression	*type*
a	int *
*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

End of Exam. Total Points: 40

XY B F R B 9 2 C E P E 3 8 C 8 2 D 6 C F 3T

B KEY CISC 181 sections 010-012, Midterm 2 11/11/05

The following questions deal with this code excerpt:

```
// quiz question
#include <iostream>
using namespace std;

struct Point_S
{
  int x;
  int y;
};

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



{
   int *a;
   int *b;
   int  c;

   double  d;
   double *e;
   double *f;
   double  g;

   Point_S  p;
   Point_S *q;
   Point_S *r;
   Point_S *s;
   Point_S  t;

   a = new int;
   b=&c;

   e = new double;
   f = &d;

   q = new Point_S;
   r = &p ;
   s = &t;

   cout << "Hi" << endl;
   return 0;
}
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a	stack heap error
*a	stack heap error
b	stack heap error
*b	stack heap error
c	stack heap error
*c	stack heap error
*d	stack heap error
*e	stack heap error
f	stack heap error
*f	stack heap error
g	stack heap error
*g	stack heap error
p	stack heap error
*p	stack heap error
*q	stack heap error
*r	stack heap error
*s	stack heap error
*t	stack heap error

expression	*type*
a	int *
*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

expression	*Answer*		
a	stack		
*a		heap	
b	stack		
*b	stack		
c	stack		
*c			error
*d			error
*e		heap	
f	stack		
*f	stack		
g	stack		
*g			error
p	stack		
*p			error
*q		heap	
*r	stack		
*s	stack		
*t			error

expression	*type*
a	int *
*a	int
&a	int **
b	int *
*b	int
&b	int**
d	double
*d	error
e	double *
&e	double **
p	Point_S
*r	Point_S
&s	Point_S **
t->x	error
q.y	error
q->y	int
(*p).x	error
&(p.x)	int *
argc	int
argv[0]	char *
argv[0][1]	char
argv	char **
&argc	int *

End of Key, seed 3456 version B

Total Points: 40

CISC 181 sections 010-012, Midterm 2 11/11/05

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};

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{
   int *a;
   int  b;
   int *c;

   double *d;
   double *e;
   double  f;
   double  g;

   Point_S  p;
   Point_S  q;
   Point_S *r;
   Point_S *s;
   Point_S *t;

   c = new int;
   a=&b;

   d = new double;
   e=&f;

   r = new Point_S;
   s = new Point_S;
   t=&p;

   cout << "Hi" << endl;
   return 0;
}
```

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*e	stack heap error
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*f	stack heap error
g	stack heap error
*g	stack heap error
p	stack heap error
*p	stack heap error
*q	stack heap error
*r	stack heap error
*s	stack heap error
*t	stack heap error

expression	*type*
a	int *
*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

End of Exam. Total Points: 40

XY A F R C 9 3 D A P E 3 8 B 8 2 D 6 B F 3N

C KEY CISC 181 sections 010-012, Midterm 2 11/11/05

The following questions deal with this code excerpt:

```
// quiz question
#include <iostream>
using namespace std;

struct Point_S
{
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  int y;
};

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



{
   int *a;
   int  b;
   int *c;

   double *d;
   double *e;
   double  f;
   double  g;

   Point_S  p;
   Point_S  q;
   Point_S *r;
   Point_S *s;
   Point_S *t;

   c = new int;
   a=&b;

   d = new double;
   e=&f;

   r = new Point_S;
   s = new Point_S;
   t=&p;

   cout << "Hi" << endl;
   return 0;
}
```

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*f	stack heap error
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*g	stack heap error
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*p	stack heap error
*q	stack heap error
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*t	stack heap error

expression	*type*
a	int *
*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

expression	*Answer*		
a	stack		
*a	stack		
b	stack		
*b			error
c	stack		
*c		heap	
*d		heap	
*e	stack		
f	stack		
*f			error
g	stack		
*g			error
p	stack		
*p			error
*q			error
*r		heap	
*s		heap	
*t	stack		

expression	*type*
a	int *
*a	int
&a	int **
b	int
*b	error
&b	int *
d	double *
*d	double
e	double *
&e	double **
p	Point_S
*r	Point_S
&s	Point_S **
t->x	int
q.y	int
q->y	error
(*p).x	error
&(p.x)	int *
argc	int
argv[0]	char *
argv[0][1]	char
argv	char **
&argc	int *

End of Key, seed 3456 version C

Total Points: 40

CISC 181 sections 010-012, Midterm 2 11/11/05

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{
   int  a;
   int *b;
   int *c;

   double *d;
   double  e;
   double  f;
   double *g;

   Point_S *p;
   Point_S  q;
   Point_S  r;
   Point_S *s;
   Point_S *t;

   b = new int;
   c = &a;

   g=new double
   d=&e;

   s = new Point_S;
   t = &r;
   p=&q;

   cout << "Hi" << endl;
   return 0;
}
```

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*f	stack heap error
g	stack heap error
*g	stack heap error
p	stack heap error
*p	stack heap error
*q	stack heap error
*r	stack heap error
*s	stack heap error
*t	stack heap error

expression	*type*
a	int
*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

End of Exam. Total Points: 40

XY B F R D 9 4 B B P E 3 8 A 8 2 D 6 A F 3S

D KEY CISC 181 sections 010-012, Midterm 2 11/11/05

The following questions deal with this code excerpt:

```
// quiz question
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using namespace std;

struct Point_S
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  int y;
};

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



{
   int  a;
   int *b;
   int *c;

   double *d;
   double  e;
   double  f;
   double *g;

   Point_S *p;
   Point_S  q;
   Point_S  r;
   Point_S *s;
   Point_S *t;

   b = new int;
   c = &a;

   g=new double
   d=&e;

   s = new Point_S;
   t = &r;
   p=&q;

   cout << "Hi" << endl;
   return 0;
}
```

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a	stack heap error
*a	stack heap error
b	stack heap error
*b	stack heap error
c	stack heap error
*c	stack heap error
*d	stack heap error
*e	stack heap error
f	stack heap error
*f	stack heap error
g	stack heap error
*g	stack heap error
p	stack heap error
*p	stack heap error
*q	stack heap error
*r	stack heap error
*s	stack heap error
*t	stack heap error

expression	*type*
a	int
*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

expression	*Answer*		
a	stack		
*a			error
b	stack		
*b		heap	
c	stack		
*c	stack		
*d	stack		
*e			error
f	stack		
*f			error
g	stack		
*g		heap	
p	stack		
*p	stack		
*q			error
*r			error
*s		heap	
*t	stack		

expression	*type*
a	int
*a	error
&a	int *
b	int*
*b	int
&b	int**
d	double *
*d	double
e	double
&e	double *
p	Point_S *
*r	error
&s	Point_S **
t->x	int
q.y	int
q->y	error
(*p).x	int
&(p.x)	error
argc	int
argv[0]	char *
argv[0][1]	char
argv	char **
&argc	int *

End of Key, seed 3456 version D

Total Points: 40

CISC 181 sections 010-012, Midterm 2 11/11/05

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- The programming questions start with number **??**. You may want to tackle them first, since they may take more time.
- 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.

The following questions deal with this code excerpt:

```
// quiz question
#include <iostream>
using namespace std;

struct Point_S
{
  int x;
  int y;
};

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



{
   int *a;
   int *b;
   int  c;

   double  d;
   double  e;
   double *f;
   double *g;

   Point_S *p;
   Point_S *q;
   Point_S  r;
   Point_S  s;
   Point_S *t;

   a = new int;
   b=&c;

   f = new double;
   g = &e;

   t = new Point_S;
   p = new Point_S;
   q = &r

   cout << "Hi" << endl;
   return 0;
}
```

1. (40 pts) Suppose you run the C++ program on the previous page, and the program reaches the line of code that prints out `Hi`.

   Indicate whether, at that point in time, the expression given in the table on the left

   - refers to a memory location on the *stack*,
   - refers to a memory location on the *heap*,
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expression	*Circle stack, heap or error*
a	stack heap error
*a	stack heap error
b	stack heap error
*b	stack heap error
c	stack heap error
*c	stack heap error
*d	stack heap error
*e	stack heap error
f	stack heap error
*f	stack heap error
g	stack heap error
*g	stack heap error
p	stack heap error
*p	stack heap error
*q	stack heap error
*r	stack heap error
*s	stack heap error
*t	stack heap error

expression	*type*
a	int *
*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

End of Exam. Total Points: 40

XY A F R E 9 5 C C P E 3 8 C 8 2 D 6 D F 3T

E KEY CISC 181 sections 010-012, Midterm 2 11/11/05

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};

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



{
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   int *b;
   int  c;

   double  d;
   double  e;
   double *f;
   double *g;

   Point_S *p;
   Point_S *q;
   Point_S  r;
   Point_S  s;
   Point_S *t;

   a = new int;
   b=&c;

   f = new double;
   g = &e;

   t = new Point_S;
   p = new Point_S;
   q = &r

   cout << "Hi" << endl;
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expression	*Circle stack, heap or error*
a	stack heap error
*a	stack heap error
b	stack heap error
*b	stack heap error
c	stack heap error
*c	stack heap error
*d	stack heap error
*e	stack heap error
f	stack heap error
*f	stack heap error
g	stack heap error
*g	stack heap error
p	stack heap error
*p	stack heap error
*q	stack heap error
*r	stack heap error
*s	stack heap error
*t	stack heap error

expression	*type*
a	int *
*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

expression	*Answer*		
a	stack		
*a		heap	
b	stack		
*b	stack		
c	stack		
*c			error
*d			error
*e			error
f	stack		
*f		heap	
g	stack		
*g	stack		
p	stack		
*p		heap	
*q	stack		
*r			error
*s			error
*t		heap	

expression	*type*
a	int *
*a	int
&a	int **
b	int *
*b	int
&b	int**
d	double
*d	error
e	double
&e	double *
p	Point_S *
*r	error
&s	Point_S *
t->x	int
q.y	error
q->y	int
(*p).x	int
&(p.x)	error
argc	int
argv[0]	char *
argv[0][1]	char
argv	char **
&argc	int *

End of Key, seed 3456 version E

Total Points: 40

CISC 181 sections 010-012, Midterm 2 11/11/05

Name_____

Please circle your section number:

010 (Wed PM)

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{
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};

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



{
   int *a;
   int  b;
   int *c;

   double  d;
   double *e;
   double *f;
   double  g;

   Point_S *p;
   Point_S *q;
   Point_S *r;
   Point_S  s;
   Point_S  t;

   c = new int;
   a=&b;

   e = new double;
   f = &d;

   p = new Point_S;
   q = new Point_S;
   r = &s;

   cout << "Hi" << endl;
   return 0;
}
```

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*a	stack heap error
b	stack heap error
*b	stack heap error
c	stack heap error
*c	stack heap error
*d	stack heap error
*e	stack heap error
f	stack heap error
*f	stack heap error
g	stack heap error
*g	stack heap error
p	stack heap error
*p	stack heap error
*q	stack heap error
*r	stack heap error
*s	stack heap error
*t	stack heap error

expression	*type*
a	int *
*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

End of Exam. Total Points: 40

XY B F R F 9 6 D D P E 3 8 B 8 2 D 6 C F 3N

F KEY CISC 181 sections 010-012, Midterm 2 11/11/05

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};

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{
   int *a;
   int  b;
   int *c;

   double  d;
   double *e;
   double *f;
   double  g;

   Point_S *p;
   Point_S *q;
   Point_S *r;
   Point_S  s;
   Point_S  t;

   c = new int;
   a=&b;

   e = new double;
   f = &d;

   p = new Point_S;
   q = new Point_S;
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*b	stack heap error
c	stack heap error
*c	stack heap error
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*e	stack heap error
f	stack heap error
*f	stack heap error
g	stack heap error
*g	stack heap error
p	stack heap error
*p	stack heap error
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expression	*type*
a	int *
*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

expression	*Answer*		
a	stack		
*a	stack		
b	stack		
*b			error
c	stack		
*c		heap	
*d			error
*e		heap	
f	stack		
*f	stack		
g	stack		
*g			error
p	stack		
*p		heap	
*q		heap	
*r	stack		
*s			error
*t			error

expression	*type*
a	int *
*a	int
&a	int **
b	int
*b	error
&b	int *
d	double
*d	error
e	double *
&e	double **
p	Point_S *
*r	Point_S
&s	Point_S *
t->x	error
q.y	error
q->y	int
(*p).x	int
&(p.x)	error
argc	int
argv[0]	char *
argv[0][1]	char
argv	char **
&argc	int *

End of Key, seed 3456 version F

Total Points: 40

CISC 181 sections 010-012, Midterm 2 11/11/05

Name_____

Please circle your section number:

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012 (Mon AM)

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   int *c;

   double *d;
   double *e;
   double  f;
   double  g;

   Point_S  p;
   Point_S *q;
   Point_S *r;
   Point_S *s;
   Point_S  t;

   b = new int;
   c = &a;

   d = new double;
   e=&f;

   q = new Point_S;
   r = &p ;
   s = &t;

   cout << "Hi" << endl;
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*g	stack heap error
p	stack heap error
*p	stack heap error
*q	stack heap error
*r	stack heap error
*s	stack heap error
*t	stack heap error

expression	*type*
a	int
*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

End of Exam. Total Points: 40

XY A F R G 9 7 B E P E 3 8 A 8 2 D 6 B F 3S

G KEY CISC 181 sections 010-012, Midterm 2 11/11/05

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};

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   int *c;

   double *d;
   double *e;
   double  f;
   double  g;

   Point_S  p;
   Point_S *q;
   Point_S *r;
   Point_S *s;
   Point_S  t;

   b = new int;
   c = &a;

   d = new double;
   e=&f;

   q = new Point_S;
   r = &p ;
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expression	*type*
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*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

expression	*Answer*		
a	stack		
*a			error
b	stack		
*b		heap	
c	stack		
*c	stack		
*d		heap	
*e	stack		
f	stack		
*f			error
g	stack		
*g			error
p	stack		
*p			error
*q		heap	
*r	stack		
*s	stack		
*t			error

expression	*type*
a	int
*a	error
&a	int *
b	int*
*b	int
&b	int**
d	double *
*d	double
e	double *
&e	double **
p	Point_S
*r	Point_S
&s	Point_S **
t->x	error
q.y	error
q->y	int
(*p).x	error
&(p.x)	int *
argc	int
argv[0]	char *
argv[0][1]	char
argv	char **
&argc	int *

End of Key, seed 3456 version G

Total Points: 40

CISC 181 sections 010-012, Midterm 2 11/11/05

Name_____

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   int *b;
   int  c;

   double *d;
   double  e;
   double  f;
   double *g;

   Point_S  p;
   Point_S  q;
   Point_S *r;
   Point_S *s;
   Point_S *t;

   a = new int;
   b=&c;

   g=new double
   d=&e;

   r = new Point_S;
   s = new Point_S;
   t=&p;

   cout << "Hi" << endl;
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*f	stack heap error
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*t	stack heap error

expression	*type*
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*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

End of Exam. Total Points: 40

XY B F R H 9 1 C A P E 3 8 C 8 2 D 6 A F 3T

H KEY CISC 181 sections 010-012, Midterm 2 11/11/05

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};

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   int  c;

   double *d;
   double  e;
   double  f;
   double *g;

   Point_S  p;
   Point_S  q;
   Point_S *r;
   Point_S *s;
   Point_S *t;

   a = new int;
   b=&c;

   g=new double
   d=&e;

   r = new Point_S;
   s = new Point_S;
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*c	stack heap error
*d	stack heap error
*e	stack heap error
f	stack heap error
*f	stack heap error
g	stack heap error
*g	stack heap error
p	stack heap error
*p	stack heap error
*q	stack heap error
*r	stack heap error
*s	stack heap error
*t	stack heap error

expression	*type*
a	int *
*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

expression	*Answer*		
a	stack		
*a		heap	
b	stack		
*b	stack		
c	stack		
*c			error
*d	stack		
*e			error
f	stack		
*f			error
g	stack		
*g		heap	
p	stack		
*p			error
*q			error
*r		heap	
*s		heap	
*t	stack		

expression	*type*
a	int *
*a	int
&a	int **
b	int *
*b	int
&b	int**
d	double *
*d	double
e	double
&e	double *
p	Point_S
*r	Point_S
&s	Point_S **
t->x	int
q.y	int
q->y	error
(*p).x	error
&(p.x)	int *
argc	int
argv[0]	char *
argv[0][1]	char
argv	char **
&argc	int *

End of Key, seed 3456 version H

Total Points: 40

CISC 181 sections 010-012, Midterm 2 11/11/05

Name_____

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#include <iostream>
using namespace std;

struct Point_S
{
  int x;
  int y;
};

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



{
   int *a;
   int  b;
   int *c;

   double  d;
   double  e;
   double *f;
   double *g;

   Point_S *p;
   Point_S  q;
   Point_S  r;
   Point_S *s;
   Point_S *t;

   c = new int;
   a=&b;

   f = new double;
   g = &e;

   s = new Point_S;
   t = &r;
   p=&q;

   cout << "Hi" << endl;
   return 0;
}
```

1. (40 pts) Suppose you run the C++ program on the previous page, and the program reaches the line of code that prints out `Hi`.

   Indicate whether, at that point in time, the expression given in the table on the left

   - refers to a memory location on the *stack*,
   - refers to a memory location on the *heap*,
   - would cause an *error* (e.g. dereferencing something that isn't a pointer.)

   Then, in the table on the right, fill in the type of each expression, or write "error" if the expression would not be valid (e.g. dereferencing something that isn't a pointer, or using the dot operator (`.`) on something that isn't a `struct`.

expression	*Circle stack, heap or error*
a	stack heap error
*a	stack heap error
b	stack heap error
*b	stack heap error
c	stack heap error
*c	stack heap error
*d	stack heap error
*e	stack heap error
f	stack heap error
*f	stack heap error
g	stack heap error
*g	stack heap error
p	stack heap error
*p	stack heap error
*q	stack heap error
*r	stack heap error
*s	stack heap error
*t	stack heap error

expression	*type*
a	int *
*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

End of Exam. Total Points: 40

XY A F R I 9 2 D B P E 3 8 B 8 2 D 6 D F 3N

KEY CISC 181 sections 010-012, Midterm 2 11/11/05

The following questions deal with this code excerpt:

```
// quiz question
#include <iostream>
using namespace std;

struct Point_S
{
  int x;
  int y;
};

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



{
   int *a;
   int  b;
   int *c;

   double  d;
   double  e;
   double *f;
   double *g;

   Point_S *p;
   Point_S  q;
   Point_S  r;
   Point_S *s;
   Point_S *t;

   c = new int;
   a=&b;

   f = new double;
   g = &e;

   s = new Point_S;
   t = &r;
   p=&q;

   cout << "Hi" << endl;
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f	stack heap error
*f	stack heap error
g	stack heap error
*g	stack heap error
p	stack heap error
*p	stack heap error
*q	stack heap error
*r	stack heap error
*s	stack heap error
*t	stack heap error

expression	*type*
a	int *
*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

expression	*Answer*		
a	stack		
*a	stack		
b	stack		
*b			error
c	stack		
*c		heap	
*d			error
*e			error
f	stack		
*f		heap	
g	stack		
*g	stack		
p	stack		
*p	stack		
*q			error
*r			error
*s		heap	
*t	stack		

expression	*type*
a	int *
*a	int
&a	int **
b	int
*b	error
&b	int *
d	double
*d	error
e	double
&e	double *
p	Point_S *
*r	error
&s	Point_S **
t->x	int
q.y	int
q->y	error
(*p).x	int
&(p.x)	error
argc	int
argv[0]	char *
argv[0][1]	char
argv	char **
&argc	int *

End of Key, seed 3456 version I

Total Points: 40

CISC 181 sections 010-012, Midterm 2 11/11/05

Name_____

Please circle your section number:

010 (Wed PM)

011 (Mon PM)

012 (Mon AM)

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 @@@% multiple choice, and @@@% programming.
- The programming questions start with number **??**. You may want to tackle them first, since they may take more time.
- 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.

The following questions deal with this code excerpt:

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   int *c;

   double  d;
   double *e;
   double *f;
   double  g;

   Point_S *p;
   Point_S *q;
   Point_S  r;
   Point_S  s;
   Point_S *t;

   b = new int;
   c = &a;

   e = new double;
   f = &d;

   t = new Point_S;
   p = new Point_S;
   q = &r

   cout << "Hi" << endl;
   return 0;
}
```

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   Indicate whether, at that point in time, the expression given in the table on the left

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*r	stack heap error
*s	stack heap error
*t	stack heap error

expression	*type*
a	int
*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

End of Exam. Total Points: 40

XY B F R J 9 3 B C P E 3 8 A 8 2 D 6 C F 3S

J KEY CISC 181 sections 010-012, Midterm 2 11/11/05

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{
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  int y;
};

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



{
   int  a;
   int *b;
   int *c;

   double  d;
   double *e;
   double *f;
   double  g;

   Point_S *p;
   Point_S *q;
   Point_S  r;
   Point_S  s;
   Point_S *t;

   b = new int;
   c = &a;

   e = new double;
   f = &d;

   t = new Point_S;
   p = new Point_S;
   q = &r

   cout << "Hi" << endl;
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*g	stack heap error
p	stack heap error
*p	stack heap error
*q	stack heap error
*r	stack heap error
*s	stack heap error
*t	stack heap error

expression	*type*
a	int
*a	
&a	
b	
*b	
&b	
d	
*d	
e	
&e	
p	
*r	
&s	
t->x	
q.y	
q->y	
(*p).x	
&(p.x)	
argc	
argv[0]	
argv[0][1]	
argv	
&argc	

expression	*Answer*		
a	stack		
*a			error
b	stack		
*b		heap	
c	stack		
*c	stack		
*d			error
*e		heap	
f	stack		
*f	stack		
g	stack		
*g			error
p	stack		
*p		heap	
*q	stack		
*r			error
*s			error
*t		heap	

expression	*type*
a	int
*a	error
&a	int *
b	int*
*b	int
&b	int**
d	double
*d	error
e	double *
&e	double **
p	Point_S *
*r	error
&s	Point_S *
t->x	int
q.y	error
q->y	int
(*p).x	int
&(p.x)	error
argc	int
argv[0]	char *
argv[0][1]	char
argv	char **
&argc	int *

End of Key, seed 3456 version J

Total Points: 40