```sas
/* 4장 연습문제 */

/*----------------------------------------------------------------------*/

/* 1번 */

/*----------------------------------------------------------------------*/

data energy;
input Region $ Division $ State $ Type $ Expenditures @@;
cards;
1 1 ME 1 708 1 1 ME 2 379 1 1 NH 1 597 1 1 NH 2 301 1 1 VT 1 353
1 1 VT 2 188 1 1 MA 1 3264 1 1 MA 2 2498 1 1 RI 1 531 1 1 RI 2 358
1 1 CT 1 2024 1 1 CT 2 1405 1 2 NY 1 8786 1 2 NY 2 7825 1 2 NJ 1 4115
1 2 NJ 2 35588 1 2 PA 1 6478 1 2 PA 2 3695 4 3 MT 1 322 4 3 MT 2 232
4 3 ID 1 392 4 3 ID 2 298 4 3 WY 1 194 4 3 WY 2 184 4 3 CO 1 1215
4 3 CO 2 1173 4 3 NM 1 545 4 3 NM 2 578 4 3 AZ 1 1694 4 3 AZ 2 1448
4 3 UT 1 621 4 3 UT 2 438 4 3 NV 1 493 4 3 NV 2 378 4 4 WA 1 1680
4 4 WA 2 1122 4 4 OR 1 1014 4 4 OR 2 756 4 4 CA 1 10643
4 4 CA 2 10114 4 4 AK 1 349 4 4 AK 2 329 4 4 HI 1 273 4 4 HI 2 298
;
run;
proc format;
  value $regfmt '1'='Northeast' '2'='South' '3'='Midwest' '4'='west';
  value $divfmt '1'='New England' '2'='Middle Atlantic' '3'='Mountain' '4'='pacific';
  value $typetmf '1'='주거용' '2'='산업용';
run;
/* 빈도수 */
proc freq data=energy;
  table Division;
run;


/*----------------------------------------------------------------------*/

/* 1-1번 */
/* label, format 해주기 */

proc gchart data=energy;
  hbar Division;
  format Division $divfmt. ;
  label Division='권역';
run;

/*----------------------------------------------------------------------*/

/* 1-2번 */

proc gchart data=energy;
  vbar Expenditures / levels=5 ;
```

```sas
   format Division $divfmt. ;
   label Expenditures='소비량';
run;


/*-----------------------------------------------------------------------*/

/* 1-3번 */
/* group에서 = 꼭 붙여줘야함 */

proc gchart data=energy;
  vbar Division /group=Type ;
  format Division $divfmt.Type $typetmf. ;
  label Division='권역' Type='유형별';
run;


/*-----------------------------------------------------------------------*/

/* 1-4번 */
/* sumvar= (Y축에 표기할 변수) */

proc gchart data=energy;
  vbar Division /group=Type sumvar=Expenditures;
  format Division $divfmt.Type $typetmf. ;
  label Division='권역' Type='유형별' Expenditures='소비량';
run;


/*-----------------------------------------------------------------------*/

/* 1-5번 */

data x;
set energy;
if (Type='1') then x=Expenditures;
if (x='.') then delete;
keep State x;
proc sort data=x;
by State;
run;

data y;
set energy;
if (Type='2') then y=Expenditures;
if (y='.') then delete;
keep State y;
proc sort data=y;
by State;
run;

data xy;
```

```sas
merge x y;
by State;
proc print; run;


proc gplot data=xy;
  plot y*x='star';
run;


/*-----------------------------------------------------------------------*/

/* 1-6번 */

goptions  device=win  vsize=5  hsize=5  vorigin=5  horigin=5  ftext=swiss  htext=1.0  ftitle=centx
htitle=1;
proc reg data=xy;
  model x=y;
  output out=b p=yhat;
run;
proc gplot data=xy;
  plot y*x='star' yhat*x='1' / overlay ;
run;


/*-----------------------------------------------------------------------*/

/* 2번 */

/*-----------------------------------------------------------------------*/


data sales;
input Region $ CitySize $ Popuiation Product $ SaleType $ Units NetSales @@;
cards;
NC S 25000 A100 R 150 3750.00
NC M 125000 A100 R 350 8650.00
NC L 837000 A100 R 800 20000.00
NC S 25000 A100 W 150 3000.00
NC M 125000 A100 W 350 7000.00
NC M 625000 A100 W 750 15000.00
TX M 227000 A100 W 350 7250.00
TX L 5000 A100 W 750 5000.00
;
run;


/*-----------------------------------------------------------------------*/

/* 2-1번 */

proc gchart data=sales;
  pie Popuiation / subgroup=CitySize;
run;
```

```sas
/*----------------------------------------------------------------------------*/

/* 2-2번 */

proc gchart data=sales;
  pie Popuiation / subgroup=NetSales;
run;

/*----------------------------------------------------------------------------*/

/* 2-3번 */

proc gchart data=sales;
  vbar SaleType / group=CitySize sumvar=NetSales;
  label SaleType='도소매별' CitySize='도시규모별' NetSales='판매순익';
run;

/*----------------------------------------------------------------------------*/

/* 2-4번 */

proc sort data=sales;
  by CitySize;
run;
proc boxplot data=sales;
  plot NetSales*CitySize / boxstyle=schematic ;
run;

/*----------------------------------------------------------------------------*/

/* 2-5번 */

proc sort data=sales;
  by Region;
run;
proc boxplot data=sales;
  plot NetSales*Region / boxstyle=skeletal ;
run;

/*----------------------------------------------------------------------------*/
```