# STAT430 Project 1

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1. Conducting a survey to check to answer the main question of whether Age, Gender and Employment affect a person's time spent playing video games in a week? I also want to see that if any of these things do affect the time spent playing then what are the numbers? Furthermore, an additional, not as important, but fun questions I wanted to answer was what is most people's preferred gaming platform? The survey was conducted over multiple sub-reddits and through the STAT430 class.

   The Variables in Question in my survey were:

   1. Gender
   2. Employment
   3. Hours Spent gaming per week
   4. Age

Note: All survey questions for this part have been attached below.

2. The different Conclusions, we can reach from the plots and the descriptions shown In part 4.

   1. Men spend a lot more time playing video games than women do (Refer to Figures 7,8 and 11). (Figure 7) This plot shows us the distribution of males and females and the time they spent playing video games. It shows us a few outliers and implies that males within the age range of 15-25 spend a lot more time gaming than women of the same age range do. These men spend around 5 to 30 hours gaming per week, whereas women only spend 0 to 5 hours per week. (Figure 8) To confirm the above implication, we plot the average time both males and females spend playing video games. From the results we can easily conclude that on average men, spend more time playing video games than women do.

   2. Employees on average spend more time playing video games than students and that Part-time Employees Spend more time playing than full time ones. (Refer to Figures 9 and 10). (Figure 9) The plot implies that for the most part (disregarding the outliers), both students and employees (whether part time or full time) spend a similar amount of time playing video games. Also, as we saw in the previous plot, most people who play video games are within the age range of 15-25. (Figure 10) To check the implication of whether or not the above statement is true that both students and employees (whether part time or full time) spend a similar amount of time playing video games, we find the mean value of hours spent playing games for students and both employment types After looking at the above results, we actually see that employees on average spend more time playing video games than students and that Part - time Employees Spend more time playing than full time ones but the difference between the two employee types is minimal so this is what we conclude.

3. Age does not effect time spent playing video games (Refer to Figures 11 and 12).
   (Figure 11) Looking at the results it seems like age does not effect how much time is spent playing video games as the above plot shows that the time spent playing video games is similar in most age groups in our data, except the last one but that may be because of outliers and because the age group in our data set is heavily centered around 20-30 years. This plot also shows us that men spend a lot more time playing video games than women, a conclusion we reached before. (Figure 12) To confirm the above implication of age not effect playing time we see the median playing time for each age group. Again, the medians in each age group are close together, so in general we can conclude that age does not affect the time spent playing video games.

**More conclusions:**
4. People within the age range 15-25 spend the most time playing video games (mostly men) (Refer to Figure 7 and the explanation for the figure above) .
5. Part time employees spend the most time playing video games per week (15 hours on avg) (Refer to figure 10 and the explanation for the figure above).
6. Most people play video games on a PC. The ones who don't are equally likely to play on either an XBOX or a PlayStation. (Refer to Figure 5 and the explanation for the figure above)

**FINAL CONCLUSION/MAIN RESULT/MAIN ANSWER:**
Hence, looking at all of the above conclusions we can answer our question:
Gender and Employment DO affect the time spent playing video games but Age does NOT.
People of all ages spend a similar amount of time playing video games.

Bringing all of our conclusions together we can see that:
Part-Time Employees, who are 15 to 25 year olds are the most likely to play video games and they spend between 5 to 30 hours gaming every week, probably on a PC.


3.  Copy of Survey attached below:

# Gaming Survey

* Required

1. **Gender** *

   *Mark only one oval.*

   ◯ Male

   ◯ Female

2. **Age** *

   _____

3. **Preferred Gaming Platform** *

   *Mark only one oval.*

   ◯ PlayStation

   ◯ Xbox

   ◯ PC

4. **Hours spent gaming per week** *

   _____

5. **Employment** *

   *Mark only one oval.*

   ◯ Student

   ◯ Part - time Employee

   ◯ Full - time Employee

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| Gender | Age | Gaming Platform | Hours Spent | Employment type |
|---|---|---|---|---|
| Male | 22 | PlayStation | 10 | Part - time Employee |
| Male | 23 | PlayStation | 11 | Part - time Employee |
| Male | 20 | PC | 3 | Student |
| Female | 20 | PC | 20 | Student |
| Female | 20 | PC | 3 | Student |
| Male | 22 | PC | 4 | Full - time Employee |
| Male | 22 | PC | 15 | Student |
| Male | 20 | PC | 20 | Part - time Employee |
| Female | 20 | PC | 15 | Student |
| Female | 21 | PlayStation | 4 | Student |
| Female | 20 | PC | 1 | Student |
| Female | 24 | Xbox | 2 | Student |
| Male | 18 | Xbox | 3 | Student |
| Male | 20 | Xbox | 3 | Student |
| Female | 18 | PC | 0 | Student |
| Male | 19 | PC | 0 | Part - time Employee |
| Male | 18 | Xbox | 6 | Student |
| Male | 30 | PC | 5 | Part - time Employee |
| Male | 20 | PC | 15 | Student |
| Female | 27 | PC | 0 | Student |
| Male | 19 | PC | 15 | Student |
| Male | 29 | PC | 3 | Part - time Employee |
| Female | 20 | Xbox | 0 | Student |
| Female | 22 | PC | 4 | Student |
| Female | 20 | PC | 0 | Student |
| Male | 27 | PC | 6 | Student |
| Female | 25 | PlayStation | 0 | Student |
| Male | 21 | PC | 10 | Student |
| Male | 20 | PC | 3 | Student |
| Female | 21 | PC | 15 | Part - time Employee |
| Male | 32 | Xbox | 13 | Full - time Employee |
| Male | 21 | PC | 25 | Student |
| Male | 18 | Xbox | 12 | Full - time Employee |
| Male | 16 | PC | 12 | Student |
| Male | 24 | PC | 6 | Full - time Employee |
| Male | 17 | PC | 20 | Student |
| Female | 24 | PC | 30 | Full - time Employee |
| Male | 25 | PC | 10 | Full - time Employee |
| Male | 19 | PC | 15 | Student |
| Male | 20 | PC | 5 | Student |
| Male | 19 | Xbox | 20 | Part - time Employee |
| Male | 18 | Xbox | 30 | Student |
| Male | 19 | PC | 4 | Student |
| Male | 25 | Xbox | 0 | Student |
| Male | 18 | PC | 3 | Student |
| Male | 20 | PlayStation | 0 | Student |

| Gender | Age | Platform | Hours | Occupation |
|--------|-----|----------|-------|------------|
| Male | 29 | PC | 15 | Student |
| Male | 18 | PC | 3 | Part - time Employee |
| Male | 18 | Xbox | 2 | Student |
| Male | 20 | PlayStation | 10 | Student |
| Male | 27 | PlayStation | 30 | Part - time Employee |
| Male | 23 | PlayStation | 0 | Student |
| Male | 21 | PC | 30 | Student |
| Male | 20 | PC | 15 | Part - time Employee |
| Male | 20 | PC | 30 | Part - time Employee |
| Male | 19 | PlayStation | 1 | Student |
| Male | 24 | PC | 50 | Student |
| Male | 28 | PC | 16 | Full - time Employee |
| Male | 20 | PC | 4 | Student |
| Male | 20 | PC | 20 | Student |
| Male | 30 | PC | 30 | Student |
| Male | 23 | PC | 6 | Full - time Employee |
| Male | 18 | PC | 5 | Part - time Employee |
| Male | 19 | PC | 12 | Student |
| Male | 19 | PC | 5 | Student |
| Male | 20 | PlayStation | 3 | Student |
| Male | 22 | PC | 10 | Student |
| Male | 21 | PC | 28 | Student |
| Male | 19 | PC | 25 | Student |
| Male | 22 | PlayStation | 39 | Part - time Employee |
| Male | 21 | PC | 20 | Student |
| Male | 19 | PlayStation | 12 | Student |
| Male | 21 | PC | 5 | Student |
| Male | 19 | PC | 17 | Student |
| Male | 20 | PC | 20 | Full - time Employee |
| Male | 27 | PlayStation | 8 | Full - time Employee |
| Female | 28 | PC | 8 | Full - time Employee |
| Male | 19 | PC | 18 | Part - time Employee |
| Male | 22 | PC | 15 | Student |
| Male | 30 | PC | 12 | Student |
| Male | 22 | PC | 10 | Student |
| Male | 21 | Xbox | 8 | Student |
| Male | 23 | PC | 3 | Student |
| Male | 45 | PC | 45 | Full - time Employee |
| Male | 27 | PlayStation | 20 | Full - time Employee |
| Male | 17 | PC | 4 | Student |
| Male | 20 | PC | 10 | Student |
| Female | 18 | Xbox | 2 | Student |
| Male | 20 | PC | 60 | Student |
| Male | 20 | PC | 30 | Part - time Employee |

```sas
/* Note: whenever I refer to time spent playing video games in this file, I am referring to
time spent playing games PER WEEK. Not mentioning it to remove redundancy */

/* Reading in the data from a CSV file.
Note: Giving Variables Platform and Employment length 20 as otherwise
SAS does not read in the entirety of the string  */
Data survey;
    INFILE '/home/aliparacha19960/EPG194/Survey.csv' delimiter=',';
    Length Platform $20;
    Length Employment $20;
    Input
    Gender $ Age Platform $ Hours_Spent_Gaming Employment $
    ;
run;

/*1.
 * Main Question to Answer: Does Age,Gender and Employment affect time spent playing video games?

Variables in Question: 1. Gender 2. Employment 3. Hours Spent gaming per week 4. Age
Note: All survey questions for this part have been attached below. */

/* 2.
 * Part 1: Analyzing Quantitative Data
 */

/* Creating formats for hours spent gaming and age. These might prove helpful later on  */
proc format;
value hours 0-10='0-10'
11-20='11-20'
21-30='21-30'
other = 'Greater than 30';

value AGEGRP 15-20='15-20'
21-25='21-25'
26-30='26-30'
31-35='31-35'
other = 'Greater than 35';
run;

/* Finding the frequency of both age and hours_pent_gaming to get a feel for the data.
grouping them by the formates defined above. */
proc freq data=survey;
Title "Frequency Table for Age and Hours Spent Gaming (Figure 1)";
tables age hours_spent_gaming;
format age agegrp. hours_spent_gaming hours.;
run;

/* Creating Histogram for both age and hours_spent_gaming. Using buckets (defined by endpoint)
because we want the frequency of hours within a specific range. This will help us later on in
doing analysis.*/
proc univariate data=survey noprint;
Title "Histograms For Age and Hours Spent Gaming (Figure 2)";
histogram age / endpoints= 15 to 50 by 5;
histogram hours_spent_gaming / endpoints= 0 to 65 by 5;
run;
/* From the above results we can see that both age and hours are skewed right
and we have a few outliers in both as well. */

/* Since, the plot for both hours and age was skewed right and had outliers, we
will use the five number summary to describe the data as it is the best measure
of center and spread */
```

```sas
proc means data=survey min Q1 median Q3 max;
Title "Five Number Summary for age and Hours Spent Gaming (Figure 3)";
var age hours_spent_gaming;
run;


/* From the above analysis we can see that people aged 15 to 25 are most likely to play
video games and that 35% of people spend around 0 to 5 hours gaming per week. */



/* Part 2: Analyzing Qualitative Data */

/* Displaying the frequences of our categorical data*/
proc freq data=survey;
Title "Frequency Table for Gender, Employment and Plaotform (Figure 4)";
tables gender employment platform;
run;


/* Plotting pie and bar charts to better visualize our data and see its distribution*/
/* Comparing males and females and also Students and Employees, to check who our data consists
more of. Also, checking what people are more likely to play video games on. */
proc gchart data=survey;
Title "Graphs For Gender and Employment Type (Figure 5)";
vbar gender employment platform;
pie gender employment platform ;
run;
/* Looking at the above results we can easily see that our data consists of more males than
females and more students than employees. We can use this fact to help our analysis later
on. Since, we don't have an even count of frequencies in our categories we will use the average
acros each category to analyze our data.
One thing the above plot does prove however, is that people prefer playing video games on
PC rather tha XBOX or PlayStation.*/



/* Part 3: Analysis

We now want to see how gender and type of employment affect time spent playing games,
for this reason
we will draw a graph that groups our data first by gender and then by employment type, and then
creates a bar graph to see how much each of these subgroupings spends time playing video games
on average.
*/
proc gchart data=survey;
Title "Time each subgroup spends playing video games on average (Figure 6)";
vbar gender / subgroup=employment type=mean sumvar=hours_spent_gaming;
run;


/* From the above graph we can clearly see that Males on average spend more time playing
video games than females.

However it also implies that employees of either type spend more time playing video games
than students. In order to analyse this better and to figure out whether part time employees
or full time employees spend more time playing video games,
we will draw two differnt scatter plots and then means tables to see how our data is
distributed (so we can) disregard outliers if any and then use the median value to reach a
conclusion as to which gender and which employment type spends the most time playing video games.
*/
Symbol1 v= o color=red;
symbol2 v= x color=blue;
proc gplot  data=survey;
Title "Scatter Plot of hours against Age for genders (Figure 7)";
plot hours_spent_gaming*age = gender;
run;
```

```sas
/* This plot shows us the distribution of males and females and the time they spent playing
vidoe games. It shows us a few outliers and implies that males within the age range of
15-25 spend alot more time gaming than women of the same age range do. These men spend
around 5 to 30 hours gaming per week, whereas women only spend 0 to 5 hours per week. */

/* To confirm the above implication, we plot the average time both males and females spend
playing video games */
proc sort data=survey;
by gender;
run;
proc means data=survey median;
Title "Average Time spent playing video games by gender (Figure 8)";
by gender;
run;
/* From the above results we can easily conculde that on average men, spend more time playing
video games than women do. */

Symbol1 v= o color=red;
symbol2 v= x color=blue;
symbol3 v= dot color=green;
proc gplot  data=survey;
Title "Hours Spent Gaming against Age by employment (Figure 9)";
plot hours_spent_gaming*age = employment;
run;
/* This plot implies that for the most part (disregarding the outliers), both students
and employees (whether part time or full time) spend a similar amount of time playing
video games. Also, as we saw in the previous plot, most people who play video games are
within the age range of 15-25. */

/* To check the implication of whether or not the above statement is true that both students and
employees (whether part time or full time) spend a similar amount of time playing video games, we
find the mean value of hours spent playing games for students and both employment types */
proc sort data=survey;
by employment;
run;
proc means data=survey median;
Title "Average Time spent playing video games by employment (Figure 10)";
by employment;
run;
/*After looking at the above results, we actually see that employees on average spend more
time playing video games than students and that Part - time Employees Spend more time playing
than full time ones but the difference betwween the two employee types is minimal. */

/* Now finally to check whether age effects time spent playing video games, we find the
median time spent playing video games for each age group */
proc gchart data=survey;
Title "Time Spent playing video games by ages (Figure 11)";
vbar age / subgroup= gender type=mean sumvar=hours_spent_gaming;
run;
/* Looking at the above results it seems like age does not effect how much time is spent playing
video games as the above plot shows that the time spent playing video games is similar in
most age groups in our data, except the last one but that may be because of outliers and because
the age group in our data set is heavily centered around 20-30 years. This plot also
shows us that men spend alot more time playing video games than women, a conclusion we
reached before. */

/* To confirm the above implication of age not effect playing time we see the median playing
time for each age group */
proc sort data=survey;
by age;
run;
proc means data=survey median;
```

```
Title "Average Time spent playing video games by age group (Figure 12)";
by age;
format age agegrp.;
run;
/* Again the medians in each age group are close together, so in general we can say that age does
not effect the time spent playing video games */


/* The different Conclusions, We can reach from the plots and the descriptions above.
1. People prefer playing video games on PC rather tha XBOX or PlayStation (Refer to figure 5).
2. Men spend a lot more time playing video games than women do (Refer to Figures 7,8 and 11).
3. Employees on average spend more time playing video games than students and that
Part-time Employees Spend more time playing than full time ones. (Reger to Figures 9 and 10)
4. Age does not effect time spent playing video games (Refer to Figures 11 and 12).
More conclusions:
5. People within the age range 15-25 spend the most time playing video games (mostly men).
6. Part time employees spend the most time playing video games per week (15 hours on avg).
7. Most people play video games on a PC. The ones who don't are equally likely to play on
either an XBOX or a PlayStation.

FINAL CONCLUSION/MAIN RESULT/MAIN ANSWER:
Hence, looking at all of the above conclusions we can answer our question:
Gender and Employment DO affect the time spent playing video games but Age does NOT.
People of all ages spend a similar amount of time playing video games.

Bringing all of our conclusions together we can see that:
Part-Time Employees, who are 15 to 25 year olds are the most likely to play video games
and they spend between 5 to 30 hours gaming every week, probably on a PC.

*/
```

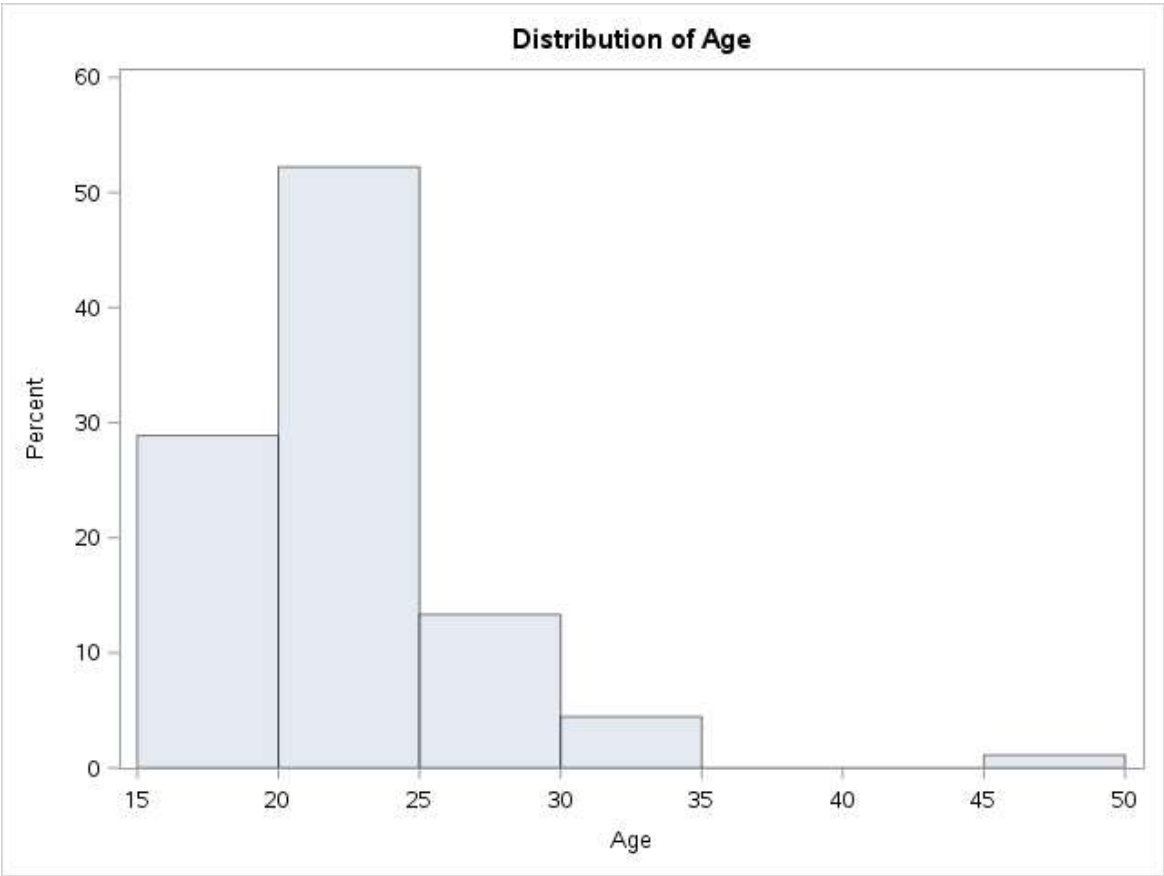## Frequency Table for Age and Hours Spent Gaming (Figure 1)

**The FREQ Procedure**

| Age | Frequency | Percent | Cumulative Frequency | Cumulative Percent |
|---|---|---|---|---|
| 15-20 | 49 | 54.44 | 49 | 54.44 |
| 21-25 | 27 | 30.00 | 76 | 84.44 |
| 26-30 | 12 | 13.33 | 88 | 97.78 |
| 31-35 | 1 | 1.11 | 89 | 98.89 |
| Greater than 35 | 1 | 1.11 | 90 | 100.00 |

| Hours_Spent_Gaming | Frequency | Percent | Cumulative Frequency | Cumulative Percent |
|---|---|---|---|---|
| 0-10 | 50 | 55.56 | 50 | 55.56 |
| 11-20 | 26 | 28.89 | 76 | 84.44 |
| 21-30 | 10 | 11.11 | 86 | 95.56 |
| Greater than 30 | 4 | 4.44 | 90 | 100.00 |

## Histograms For Age and Hours Spent Gaming (Figure 2)

**The UNIVARIATE Procedure**



Distribution of Age

## Distribution of Hours_Spent_Gaming



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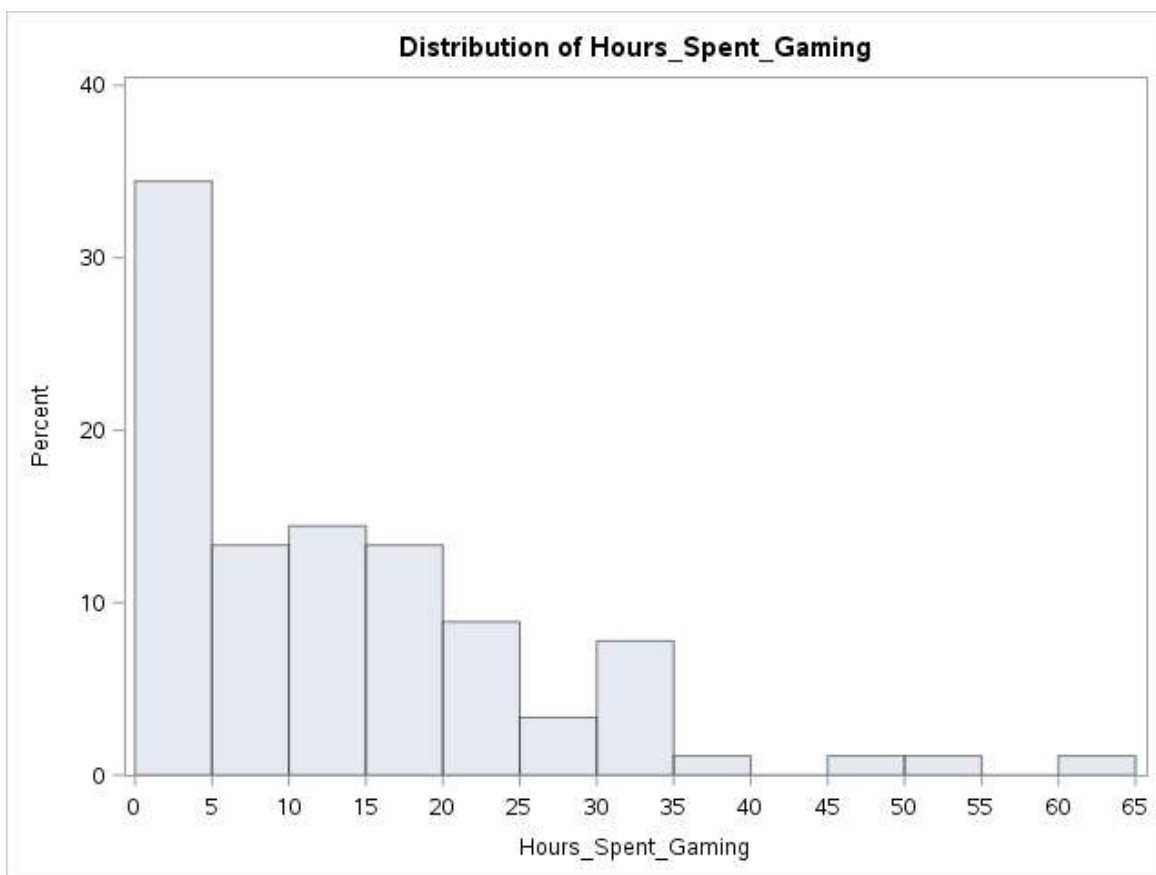
### Five Number Summary for age and Hours Spent Gaming (Figure 3)

**The MEANS Procedure**

| Variable | Minimum | Lower Quartile | Median | Upper Quartile | Maximum |
|----------|---------|----------------|--------|----------------|---------|
| Age | 16.0000000 | 19.0000000 | 20.0000000 | 23.0000000 | 45.0000000 |
| Hours_Spent_Gaming | 0 | 3.0000000 | 10.0000000 | 18.0000000 | 60.0000000 |

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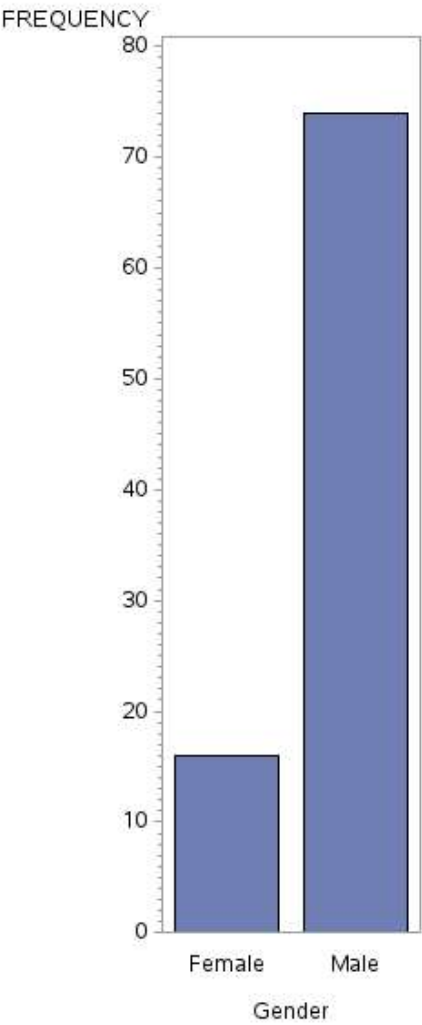### Frequency Table for Gender, Employment and Plaotform (Figure 4)

**The FREQ Procedure**

| Gender | Frequency | Percent | Cumulative Frequency | Cumulative Percent |
|--------|-----------|---------|----------------------|--------------------|
| Female | 16 | 17.78 | 16 | 17.78 |
| Male | 74 | 82.22 | 90 | 100.00 |

| Employment | Frequency | Percent | Cumulative Frequency | Cumulative Percent |
|------------|-----------|---------|----------------------|--------------------|
| Full - time Employee | 13 | 14.44 | 13 | 14.44 |
| Part - time Employee | 15 | 16.67 | 28 | 31.11 |
| Student | 62 | 68.89 | 90 | 100.00 |

| Platform | Frequency | Percent | Cumulative Frequency | Cumulative Percent |
|----------|-----------|---------|----------------------|--------------------|
| PC | 64 | 71.11 | 64 | 71.11 |
| PlayStation | 13 | 14.44 | 77 | 85.56 |
| Xbox | 13 | 14.44 | 90 | 100.00 |

## Graphs For Gender and Employment Type (Figure 5)

## Graphs For Gender and Employment Type (Figure 5)